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BREEDING BIRDS OF LAKE MEREDITH NATIONAL RECREATION AREA AND ALIBATES FLINT QUARRIES NATIONAL MONUMENT

Michael Patrikeev
*The Nature Conservancy of Texas, Amarillo, Texas**

ABSTRACT.—Lake Meredith National Recreation Area and Alibates Flint Quarries National Monument are located in the Texas Panhandle (Potter, Moore, and Hutchinson counties), and poorly known ornithologically. This paper confirms nesting of 37 species, and nesting is suspected for further 35 species. Additionally, 41 species that may or have nested in the area are discussed.

The history of bird studies in the Texas Panhandle is summarized in Seyffert (2001). It appears that the area did not command much attention from naturalists and ornithologists in the 19th and most of 20th centuries. In 1845, Lt. J. W. Abert passed through present day LMNRA while conducting reconnaissance of Canadian River, although his entries concerning birds were made from a site further upstream near

Mississippi Kite (*Ictinia mississipiensis*) at nest with young in LMNRA (July 2002). Photo by author.

*Present address: 3 Helen Street, Dundas, Ontario, L9H 1N2, Canada

Tascosa. In 1876, Lt. C. A. H. McCauley recorded 103 species of birds during the Ruffner expedition that visited Potter County. Ruffner did not pass through the LMNRA, but did come close to the area near Bonita and Chicken creeks (Seyffert 2001, J. Indeck, pers. comm.). K. D. Carlander, who was a field ornithologist at the Panhandle-Plains Historical Museum in Canyon, Texas in 1933–1935 worked in Palo Duro Canyon State Park (Seyffert 2001), but there are no records to show if he ever ventured to the LMNRA-AFQNM area.

Perhaps, it was due to the fact that the entire area laid on private lands with no public access until the early 1960s when the land was condemned and Sanford Dam built leading to filling of Lake Meredith (AFQNM still remains off-limits to general public, a limited area is open for guided groups). In 1942, P. F. Allan (U.S. Soil Conservation Commission) prepared a report on birds of the entire Texas Panhandle, yet again it is not clear whether he or his team did any studies in the area of interest. Finally, in early June 1950, W. L. Thompson recorded and collected 48 species of birds along Bugbee Creek on the Bugbee Ranch (Hutchinson County), in close proximity to the north end of LMNRA. Seyffert (2001) further reported that since the formation of Texas Panhandle Audubon Society in 1952 bird observations in the area were recorded systematically, and when LMNRA became public land, bird-watchers were visiting on a regular bases, e.g., K. D. Seyffert himself logged 129 visits to LMNRA between late October 1963 and late December 1997 (Seyffert 2001).

In 1982, an anonymous birder's checklist was compiled by US National Park Service in cooperation with the Texas Panhandle Audubon Society, and later Checklist of Vertebrates of Lake Meredith Recreation Area was prepared by Philips (1989).

However, a single detailed report on breeding birds of LMNRA-AFQNM is lacking. The current article is perhaps the first attempt to fill this void.

STUDY AREA DESCRIPTION

The Lake Meredith National Recreation Area (LMNRA) is located within the western extension of the Rolling Plains in the Texas Panhandle (Potter, Moore, and Hutchinson counties) and encompasses 18,216 ha of uplands, arid plains, wetlands, and 4,000 ha of open water. Alibates Flint Quarries National Monument (AFQNM) comprises 555 ha of uplands, and abuts LMNRA in the northeastern part of Potter County (National Park Service 2000, 2001). The Canadian River has carved a narrow, steep-walled canyon 60–90 m deep and up to 3 km wide through the area. Between this canyon and the surrounding caprock, many tributary streams have created a rough and broken topography, known as the Canadian River Breaks. Over 71% of AFQNM and over 67% of the land base at LMNRA are comprised of slopes $\geq$12%. Construction of the Sanford Dam between these "breaks" created a large reservoir, Lake Meredith, in 1962. Lake Meredith was formed primarily to allow impoundment and diversion of water for municipal and industrial purposes (National Park Service 2000, 2001).

The climate in the region is semi-arid with considerable annual ranges in temperature. The average year-round temperature is approximately +10° C (50° F), with an average of −7° C (20° F) in the winter and +33° C (93° F) in the summer. An average annual rainfall is ca. 500 mm/year, 70% of which falls between April and September. The area receives almost constant winds ca. 20 km/hour, reaching 50–60 km/hour in early spring, considerably increasing evaporation rates. The most common vegetation types present in the two parks are grasslands or shrublands, including yucca grassland, mesquite savanna, mixed grassland, cottonwood savanna, vegetated cliffs, disturbed grassland, shoreline scrub thickets, etc. Wetlands comprise ca. 34% of the park area (National Park Service 2001). The predominant vegetative cover is comprised of Sand Sagebrush (*Artemisia filifolia*), Small Soapweed Yucca (*Yucca glauca*), Broom Snakeweed (*Gutierrezia sarothrae*), Blue Gramma (*Bouteloua gracilis*), Little Bluestem (*Schizachyrium scoparium*), Buffalo Grass (*Buchloe dactyloides*), Panhandle Prickly-Pear (*Opuntia polyacantha*), and Honey Mesquite (*Prosopis glandulosa*). Stands of cottonwood (*Populus deltoides subsp. monilifera*) and hackberry (*Celtis*) trees are found in side canyons, along the Canadian River and Lake Meredith. There are also thickets and patches of Chickasaw Plum (*Prunus angustifolia*) and Wing-leaved Soapberry (*Sapindus saponaria*). One-seeded Juniper (*Juniperus monosperma*) is common in some canyons. Varying lake levels have encouraged the encroachment of non-native salt cedar (*Tamarix ramosissima*) in floodplain areas (National Park Service 2001).

SAMPLING DESIGN

Studies of breeding birds in LMNRA and AFQNM were a part of a comprehensive inventory of vertebrate animals conducted by the Nature Conservancy under a contract to US National Park Service in 2002–2003. Implication of studying all groups of vertebrates simultaneously and a variety of methods are discussed elsewhere (Patrikeev 2004a). Due to access problems and time constraints, field studies were carried out only in the following locations within LMNRA: Bates Canyon, Bonita Creek, Chicken Creek, Dolomite Point Road, McBride Canyon, Mullinaw Crossing area, Plum Creek, Rosita Meadows (Potter County), Blue West, Big Blue Creek Valley (Moore County), Bugbee and Bugbee Canyon, Cedar Canyon, North End, North Canyon, Sanford Marsh, Sanford-Yake and Spring Canyon (Hutchinson County). The sampled areas were representative of park habitats. Reconnaissance visits were made to Big Canyon, Devil's Canyon and Saddle Horse Canyon (Potter County), but access difficulties made systematic work in those areas unfeasible. Evans Canyon, Martin's Canyon, North Turkey Creek, South Turkey Creek, and Sandy Point, as well as islands of Lake Meredith, were not visited in 2002–03. AFQNM was well covered in the present study.

RESULTS

In the 2002–03 study, nesting was confirmed for 37 and suspected for further 35 species. Seyffert (2001) reported nesting of 4 additional species in LMNRA, and 23 other species appear on the Anonymous (1982) compilation of a LMNRA bird list. Thus, breeding bird fauna of the study area may amount to 99 species. Only the 37 species that were confirmed breeding in 2002–03 are discussed below. The rest (62 species) are summarized in Table 1.

SPECIES ACCOUNTS

Mallard *Anas platyrhynchos*

Fairly common nesting species of riverine habitats and marshes associated with the Canadian River and its tributaries. Observed at Rosita Meadows, Mullinaw Crossing, in extensive marshes between Plum Creek and Dolomite Point, Sanford Marsh, etc. A nest with 10 eggs in a clump of grass in Rosita Meadows on April 23, 2002.

Mississippi Kite *Ictinia mississippiensis*

Common nesting species (the most common raptor in the study area). Primarily restricted to cottonwood savanna in the valley of the Canadian River and its tributaries in LMNRA (e.g., in Rosita Meadows, Bonita Creek, Chicken Creek, Mullinaw Crossing, Plum Creek, off Bates Canyon boat ramp and Dolomite Point Road, Blue West, Big Blue Creek, etc.), but also nests in planted trees in towns and settlements in the general vicinity of the study area (Borger, Bugbee, Fritch, Sanford). Gregarious species often nesting in loose colonies of 2–6 pairs. A conservative estimate of 40–45 pairs in LMNRA (14 nests found in 2002–2003) does not include kites nesting in adjacent settled areas. All nests were invariably in living cottonwoods (one occasion in a diminishing tree that still had a clump of green leaves), 3–13 m above the ground (average 7.6 m). Nest is a relatively small, loose structure of cottonwood twigs placed in a fork of a side branch, sometimes close to tree top, and very rarely in the main stem.

Mississippi Kites arrive to the study area rather late: first records May 5–6. By June 10–15, the majority of kites already incubate. The young probably hatch in early July, because chicks c. 2 weeks old were seen standing in nests July 18–19. Some were still in nests on August 1. Two fledglings observed in Rosita Meadows on August 18.

Mississippi Kite is primarily an insect eater, but sometimes also catches vertebrate animals. Food items delivered to one nest included: dragonflies (7), grasshoppers (2), beetles (2), unidentified insects (3), toads (2), Peromyscus sp. mouse (1), unidentified small rodent (1), and small lizard (1). Large young fed by parents 1.2–4.2 times/hour.

Only one record of nest failure: when nesting tree was blown down in mid-July 2002. Several pairs nesting in Rosita Meadows apparently are not bothered by an array of motorized on-road and off-road vehicles excessively using the area and at least one pair successfully raised young there in 2002.

Red-tailed Hawk *Buteo jamaicensis*

Uncommon resident (10–15 pairs). Eight nests found in the 2002–2003 study: northwest of Mullinaw Crossing, by Dolomite Point Road (2), in Plum Creek Canyon, Alibates Flint Quarries, Blue West, east of Bugbee and Spring Canyon. Single birds or pairs also recorded in Rosita Meadows and McBride Canyon.

All nests built in cottonwoods (four in living trees and four in dead trees), 4.5–10 m above the ground, usually in the main fork or on a heavy side branch. Adults observed by nests from mid-February. Incubation occurred between early March and early May. Adults carrying food seen from April 27. A downy young seen in AFQNM on May 24, 2002, remained in the nest at least until June 26, but fledged by July 7. Another large downy young in a nest at Mullinaw Crossing on June 10, 2003. One nest at Dolomite Point perished when the nesting tree collapsed, and a nest east of Bugbee was predated. A nest in AFQNM was used in two consecutive years.

Small mammals and reptiles probably constitute the bulk of this species diet. Seen carrying a gopher and eating a large snake.

American Kestrel *Falco sparverius*

Uncommon, but widespread. Observed in McBride Canyon, Bates Canyon, Plum Creek Canyon, Dolomite Point grasslands, Alibates Flint Quarries, Big Blue Creek, Sanford-Yake, Spring Canyon, etc. Probably nests in clefts and cavities in cliffs, as well as in tree cavities (natural or excavated by woodpeckers). No nests found during this study, but a brood of 3 observed by Dolomite Point Road on July 2, 2002, and another of 4 in AFQNM on August 2, 2002.

Wild Turkey *Meleagris gallopavo*

Common, but secretive and inconspicuous in the study area. Turkeys or their tracks recorded in Rosita Meadows, Bonita Creek, Chicken Creek, Mullinaw Crossing, Plum Creek, McBride Canyon, Bates Canyon, Dolomite Point Road, Big Blue Creek, Bugbee Canyon, and east of Bugbee. In the study area, inhabits mostly cottonwood savanna with tamarisk and soapberry thickets, although sometimes observed in grasslands and mesquite savanna. Breeding activity from April. A displaying gobbler and 4 hens observed at Bonita Creek on May 7, 2002. Gobbling continues into early summer (e.g., at Mullinaw Crossing on June 10). No nests recorded during this study, but a hen with two small, but already flying chicks at Plum Creek on June 18, 2002. In addition, two family groups of 7 birds each seen at Bonita Creek and in the McBride Canyon woodlot on July 19 and September 15, 2003, respectively. On November 6, 2003, 3 flocks totaling c. 35 birds were observed on the adjacent LX Ranch.

Scaled Quail *Callipepla squamata*

Uncommon resident. In 2002–03, observed only in the northernmost part of LMNRA: in mesquite savanna of Sanford-Yake and North End, and in mixed grasslands in Cedar Canyon. Calling from mid-April. No nests of this species found during this study, but an adult with at least three small chicks observed in the North End Triangle on June 13, 2002, a brood with at least 5 large young along FM 3395 west of Bugbee on July 16, 2003, and a pair with 5–6 large young in Sanford-Yake on July 17, 2002.

The Canadian River canyon just below Lake Meredith. Mixed grasslands predominate in this area, except for the scree slopes. There are also patches of mesquite savanna in the center; poplar savanna outlines the Canadian River. Extensive mudflates and Lake Meredith appear on the background.

Northern Bobwhite *Colinus virginianus*

Common resident. Most frequently heard and seen in mesquite savanna and mixed grasslands in the northernmost parts of LMNRA (Sanford-Yake, vicinity of Bugbee, North Canyon, Spring Canyon, North End), but also occurs in cottonwood savanna and bush thickets in the Canadian River Valley (Bonita Creek, Mullinaw Crossing, Dolomite Point Road), few in bush patches in AFQNM. Vocally active from late April-early May through late July-early August. No nests or small chicks recorded during this study, but coveys of 10–20 birds observed in North End grasslands in October, and in Sanford-Yake in January-February, 2002. In addition, an immature bobwhite was caught in a Tomahawk trap (set for small mammals) at the North End on October 24, 2002.

Killdeer *Charadrius vociferus*

Uncommon nesting species of mudflats and sandbars of the Canadian River and Lake Meredith and occasionally other open spaces, e.g., two recorded in burned semi-desert in Bates Canyon. Observed on territories from late March. Adults with young from May 7.

Mourning Dove *Zenaida macroura*

Common and widespread in savannas and grasslands. One of the most common birds of LMNRA and AFQNM. Twenty nests recorded in 2002–03, e.g., a high percentage (30%) of ground nests: hidden in tall grass, under tree cholla cactus (*Opuntia imbricata*) or yucca. Other nests in shrubs or trees (soapberry, hackberry, cottonwood, mesquite, Chinese Elm, *Ulmus parvifolia*), 0.2–9 m above the ground. Clutches of 1–2 eggs found from late April through mid-July, young from mid-May, and fledglings from ca. July 10. The majority of low and ground nests were predated.

Yellow-billed Cuckoo *Coccyzus americanus*

Uncommon nesting species in the study area. Observed in McBride Canyon, Bates Canyon, riverine thickets between Bates Canyon ramp and Dolomite Point, Alibates Flint Quarries, Bugbee Canyon, Blue West and Big Blue Creek Valley. Probably occurs in suitable habitat (shrub patches and woodlots) elsewhere. One nest in a soapberry, 5 m above the ground in a small shrub-tree patch in Bates Canyon (Potter County) on June 28, 2002.

Greater Roadrunner *Geococcyx californianus*

Uncommon but widespread in the study area. Inhabits upland mesquite savanna with thick shrub patches, cottonwood savanna and tamarisk thickets of the Canadian River Valley. Recorded throughout LMNRA, e.g., in Rosita Meadows, Mullinaw Crossing, Plum Creek, west of Bates Canyon and Dolomite Point Road, vicinity of Bugbee, Sanford-Yake, Blue West and Big Blue Creek Valley. Nests are well hidden in shrub thickets (e.g., Chickasaw plum) and tree foliage (cottonwood), 1.2–1.8 m above the ground. Nesting activity commences early in the season: adults carrying food seen from early May. A nest with shell fragments (likely predated) in Blue West

Mixed grassland in Alibates Flint Quarries NM with patches of Chickasaw Plums and dead cottonwoods.

on May 5, 2002, another with 5 freshly-laid eggs east of Bugbee on May 6, 2003, while the young fledged from another nest in Bugbee Canyon by May 14, 2003. A late nest with 4 eggs reported from "Lake Meredith National Recreation Area, Hutchinson County" in August, 1968 (Seyffert 2001).

Eastern Screech-Owl *Otus asio*

Rare (or perhaps uncommon and under-recorded) species. Very cryptic and best found by voice, however, playback surveys in April-May, 2003 failed to generate any response. One nesting record in 2002–03: a brood of four young in cottonwood savanna west of Dolomite Point Road (Potter County) on July 1, 2002. Also heard calling continuously in Rosita Meadows (Potter County) on September 26, 2002. Seyffert (2001) reported a brood of five from Bugbee Creek area (Hutchinson County) on June 20, 1950.

Northern Flicker *Colaptes auratus*

Uncommon, but widespread. Inhabits cottonwood savanna and other grasslands with few standing trees or snags. Observed in Rosita Meadows, extensive savanna north of Mullinaw Crossing, McBride Canyon, Plum Creek, savanna off Dolomite Point Road, Alibates Flint Quarries, vicinity of Bugbee, Sanford-Yake, etc. Nests almost invariably in snags (usually cottonwoods), 3–8 m above the ground. One nest excavated near the top of a utility pole. Early nester: a nest with clutch in Rosita Meadows April 22, 2003. Large young looking out from nests recorded May 25 - July 1, and fledglings from c. May 30.

Red-headed Woodpecker *Melanerpes erythrocephalus*

Common nesting species (most common, or at least most conspicuous woodpecker in the study area). Inhabits cottonwood savannas of the Canadian River Valley (Rosita Meadows, Bonita Creek, Chicken Creek, Plum Creek, savanna west of Dolomite Point Road, Big Blue Creek) and open grassland/semi-desert areas with few standing snags (Alibates Flint Quarries, Blue West and the vicinity of Bugbee). Conservative estimate of 80–100 pairs in LMNRA, 3–4 pairs in AFQNM (a total of 10 nests found in both parks in 2002–03, e.g., 6 nests off Dolomite Point Road alone). Nests almost invariably in cottonwood snags, 3.5–12 m above the ground (average 6.6 m). Some nests only 100–300 m apart. In two cases, red-headed woodpeckers enlarged usurped nests of ladder-backed woodpeckers (Patrikeev 2004b). Arrives to the study area in early May. Adults carrying food to nestlings seen from late June. Two broods (2 young/brood) observed on August 2. In AFQNM, a pair nested in the same snag in 2002 and 2003, although a new cavity was excavated each year.

Ladder-backed Woodpecker *Picoides scalaris*

Common, although somewhat inconspicuous resident of mesquite savanna throughout the study area. Sometimes found in riverine habitats, cottonwood savanna and soapberry patches. Observed in McBride Canyon, Bates Canyon, Plum Creek, Alibates Flint Quarries, Sanford-Yake, east of Bugbee, North Canyon and at the North End. Of four nests recorded during this study, two were excavated in side limbs of cottonwoods (one in a dead tree, and another in a dead limb of a living tree), 2.5–4 m above the ground, and two others in living mesquite trees 1.2–1.5 m above the ground. Adults bringing food to young in nest-cavities observed from early May. In a nest east of Bugbee, at least one young fledged on May 30, 2003. At Blue West, a male with a fledgling seen on June 1, 2002, and adult with 2 large fledglings in Sanford-Yake on June 11, 2002. On the other hand, adults were observed feeding young in a nest cavity observed in Sanford-Yake as late as June 6, 2003. Ladder-backed woodpeckers nesting close to paved roads occasionally are killed by passing vehicles: a female and a male were found dead in the same area along FM 3395 east of Bugbee on May 19 and May 22, 2003, respectively. Both birds had beaks full of food.

Eastern Kingbird *Tyrannus tyrannus*

Uncommon nesting species of cottonwood savanna in the Canadian River Valley (Rosita Meadows, Mullinaw Crossing, northwest of McBride Canyon, west of Bates Canyon boat ramp and Dolomite Point Road) and in the vicinity of Bugbee. Two nests recorded during this study: west of Bates Canyon on June 15, 2002, and west of Dolomite Point Road on July 1, 2002. Both nests were in cottonwoods (one living and one dead), 11–12 m above the ground. Still incubating on July 1.

Western Kingbird *Tyrannus verticalis*

Uncommon to locally common in cottonwood savanna and semi-desert grasslands with few standing trees. Observed in Rosita Meadow, west of Mullinaw Crossing, in McBride Canyon, Plum Creek, Alibates Flint Quarries, east of Bugbee, Blue West, etc. Nests (n = 5) invariably in dead or dying cottonwoods, 3.5–12 m

above the ground (average 8 m). Nests built on side branches or in forks near tree tops. Curiously, two pairs of western kingbirds shared nesting tree with Bullock's orioles, and one pair also with a red-tailed hawk. Nest-building recorded from late May, and fledglings from June 26 (three broods encountered in AFQNM contained 3, 5 and 5 fledglings, respectively). In one nest, the young did not fledge until July 21. Adults feed young grasshoppers, dragonflies, cicadas and robberflies.

Scissor-tailed Flycatcher *Tyrannus forficatus*

Common, but unevenly distributed nesting species. Very common in open grassland with few standing dead trees or large shrubs and along the edge of cottonwood savanna in Bates Canyon, southern half of AFQNM and along Dolomite Point Road (20–25 pairs), but uncommon in similar habitats elsewhere in the parks (Saddle Horse Canyon, Mullinaw Crossing, Sanford-Yake, vicinity of Bugbee, North End, etc.). Nests almost invariably in dead trees or living trees with dead tops (cottonwood, soapberry), although two nests observed in living and dying mesquite, respectively. Nests (n = 15) usually built on a side branch close to tree trunk or in a small fork close to tree top, 3–12 m above the ground (average 6.5 m).

Scissor-tailed flycatchers arrive in the study area c. April 10–15. First bird with nesting material observed on May 7. Nests with eggs found from late May to c. July 20. Two examined nests contained three and four eggs, respectively. Large young ready to leave and fledglings seen from June 25. Three-four fledglings per brood (n = 3). Nests of Scissor-tailed Flycatchers are conspicuous and frequently fall to predators (at least 5 of 15 nests were predated), thus nests found later in the season are probably re-nesting attempts. Some of such late nests contained eggs and small young in late July or even early August.

Ash-throated Flycatcher *Myiarchus cinerascens*

Uncommon, but widespread species (rarely more than 1–2 pairs/site). Observed at Mullinaw Crossing, McBride Canyon, Bates Canyon, Plum Creek, Dolomite Point grasslands, Alibates Flint Quarries, Sanford-Yake, east of Bugbee, Blue West, etc. Inhabits cottonwood savanna, other grassland, or semi-desert habitats with few standing snags. Nests in natural cavities or those excavated by woodpeckers. Nest observed in an old woodpecker cavity (5.5 m above the ground) east of Bugbee, May 5, 2003. Another nest with five eggs in a vertical metal pipe (1.2 m high and mostly filled with dirt) at Mullinaw Crossing on June 10, 2003. This species is probably double-brooded: the young from the first nest fledged by May 30, but adults seen bringing nesting material into the same cavity soon after, on June 10. A family group of two adults and two large fledglings was encountered in AFQNM on June 26. Adults feed nestlings mostly grasshoppers, katydids, butterflies, moths, but also dragonflies, cicadas and beetles.

Cliff Swallow *Petrochelidon pyrrhonota*

Locally common nesting species. Two colonies recorded during this study: a smaller colony of 20–30 nests (probably not all active) under an abandoned railway bridge in Sanford-Yake (Hutchinson County) on June 11, 2002, and a larger colony with over 50 nests under Big Blue Creek bridge on FM 1913 (Moore County).

American Crow *Corvus brachyrhynchos*

Uncommon in the Canadian River Valley south of Lake Meredith. Recorded from cottonwood savanna in Rosita Meadows, Mullinaw Crossing, between Plum Creek and Bates Canyon ramps, in McBride Canyon and Blue West. Nests seen in tall cottonwoods in the valley, but content remained unverified.

Carolina Chickadee *Parus carolinensis*

Rare nesting species restricted to cottonwood savanna and several woodlots in the Canadian River Valley and adjacent canyons, e.g., Rosita Meadows, Plum Creek, Mullinaw Crossing and McBride Canyon and possibly elsewhere. Family groups of three and four observed in McBride Canyon and west of Mullinaw Crossing on June 3, 2002 and June 10, 2003, respectively.

Bewick's Wren *Thryomanes bewickii*

Uncommon nesting species of wooded canyons, although also occurs in cottonwood savanna. Observed in McBride Canyon, Bugbee Canyon, and northwest of Mullinaw Crossing. Nesting suggested by Anonymous (1982) compiler of Lake Meredith bird list, but not confirmed during this study, although an alarming pair encountered in Bugbee Canyon on May 6, 2003, and three birds observed in McBride Canyon on June 23, 2002 might have been a brood.

Rock Wren *Salpinctes obsoletus*

Common inhabitant of rocky canyons in both parks. Found in suitable habitat throughout the year, e.g., in cliffs by Mullinaw Crossing, Bates Canyon, Devil's Canyon, Alibates Flint Quarries, Cedar Canyon, small canyons in Sanford-Yake, Spring Canyon, etc. Usually 1–3 pairs/canyon. Nests from April. Adult carrying food to the young observed in Spring Canyon as early as May 8. A nest with large young in a rock cavity in AFQNM on May 22, 2002. Broods in Alibates and Bates Canyon on June 8 and June 28, respectively.

Loggerhead Shrike *Lanius ludovicianus*

Rare nesting species in the study area. Only 1–2 pairs in semi-desert grassland with few patches of Chickasaw plum by Dolomite Point Road and in adjacent parts of AFQNM (Potter County) in 2002–2003. Perhaps a few other pairs are elsewhere in the park. One or two seen off FM 3395 northwest of Bugbee. Observed on territory from early April. A nest found in a Chickasaw plum bush off Dolomite Point Road, on May 24, 2002, was empty and likely predated. A pair observed in that general vicinity in 2003.

Northern Mockingbird *Mimus polyglottos*

Common nesting species inhabiting mesquite savanna, soapberry and Chickasaw plum thickets, and to a lesser extent cottonwood savanna and planted trees in the Canadian River Valley, adjoining canyons and uplands. Occurs in suitable habitat throughout LMNRA and AFQNM. Thirteen nests found in 2002–2003. Nests in shrubs (mesquite, soapberry, Chickasaw plum) and occasionally trees (soapberry, hackberry, Chinese elm), living or sometimes dead, 0.4–3.2 m above the ground (average 1.5 m). Singing from mid-April, and nest with eggs from the first week of May through the third week of July. Nestlings recorded from mid-May, and fledglings from late May-early June. Nest failure is considerable: almost half (6) of nests found with eggs or young were later predated (possibly by snakes), in one case large nestlings overrun by ants.

European Starling *Sturnus vulgaris*

This non-native species is rather rare in the study area. Three observed in Rosita Meadows on April 17, 2002. Two pairs nested in cavities in a dead cottonwood in AFQNM. Birds with food seen entering cavities on June 26, 2002. Curiously, three other species nested in the very same cottonwood: red-tailed hawk, western kingbird, and Bullock's oriole.

Northern Cardinal *Cardinalis cardinalis*

Uncommon resident of bush thickets along the Canadian River, its tributaries, in ravines and some canyons. Readily uses encroaching tamarisk for nest and shelter, but also occurs in patches of native shrubs. Recorded in Rosita Meadows, Plum Creek, Bates Canyon, AFQNM, Sanford-Yake, Bugbee Canyon, Blue West, Big Blue Creek and probably elsewhere. Usually no more than 1–2 pairs/site. A nest with two eggs found in a tamarisk (c. 1.6 m above the ground) in a small canyon at Sanford-Yake June 11, 2002.

Blue Grosbeak *Guiraca caerulea*

Uncommon, but widely distributed nesting species. Rarely more than 1–2 pairs encountered per site per day. Observed at Mullinaw Crossing, in McBride Canyon, Bates Canyon, Plum Creek, Dolomite Point Road grasslands, Alibates Flint Quarries, Bugbee Canyon, Blue West, etc. Inhabits shrub patches (soapberry, hackberry, Chickasaw plum, tamarisk) and groves in grasslands and savanna. Nests in shrubs, 0.5–1.5 m above the ground (n=5). Nest-building observed in AFQNM on June 25, 2002. A nest found west of Mullinaw Crossing on June 10, 2002 contained four cowbird eggs and only one grosbeak egg.

Painted Bunting *Passerina ciris*

Uncommon (perhaps under-recorded), but widely distributed nesting species recorded in Saddle Horse Canyon, McBride Canyon, Dolomite Point Road grasslands, Blue West, Sanford-Yake, the vicinity of Bugbee, and North End. Inhabits mesquite savanna and bush patches (Chickasaw plum, tamarisk) in semi-desert grasslands. A completed nest found in mesquite savanna close to intersection of FM 1319 and FM 687 at the North End of LMNRA on May 26, 2002. The nest was in a mesquite tree, 1.2 m above the ground. The nest contained three cowbird eggs and one bunting hatchling on June 10, but only 2 cowbird chicks on June 13. Not all males trying to breed in the area attain full adult plumage: at least one first-year male in all-green plumage recorded singing east of Bugbee on May 25, 2003.

Field Sparrow *Spizella pusilla*

Uncommon nesting species. Current study provides first breeding evidence for Hutchinson County and LMNRA. Recorded in riverine grasslands, mesquite and cottonwood savanna at Mullinaw Crossing, in

Nest of Blue Grosbeak (*Guiraca ciris*) with four eggs of Brown-headed Cowbird (*Molothrus ater*) and one egg of the grosbeak. Photo by author.

McBride Canyon, west of Dolomite Point Road, and east of Bugbee. A nest with four newly hatched young found in mesquite savanna east of Bugbee (Hutchinson County) on May 14, 2003. The nest was in a clump of grass near the base of a small mesquite, 0.1 m above the ground.

Lark Sparrow *Chondestes grammacus*

Common nesting species of grasslands and mesquite savanna in the study area, less common in cottonwood savanna. Recorded in Rosita Meadows, Plum Creek, AFQNM, Blue West, east of Bugbee, North End, etc. Singing from late April to early May. A nest built under a small sage on a 35° slope in AFQNM contained four newly hatched chicks and one egg on May 21, 2002. On June 10, 2002, a nest with four eggs found in a mesquite (2 m above the ground) at the North End. Many broods along FM 1913 east of Fourways (Moore County) on July 13, 2003.

Western Meadowlark *Sturnella neglecta*

Common species nesting throughout Texas Panhandle (Seyffert 2001), including LMNRA (Anonymous 1982). Rather uncommon in 2002–2003. Outnumbered Eastern Meadowlarks in February, 2002, but only slightly so during the nesting season. Territorial pairs and singing males occurred in grasslands/grassy savanna throughout both parks. No nests or broods recorded in this study, but adults carrying food observed in Dolomite Point grasslands in May, 2002.

Red-winged Blackbird *Agelaius phoeniceus*

Common resident. Nests in cattail marshes and bush thickets (e.g., tamarisk thickets) adjacent to the Canadian River, associated creeks and Lake Meredith. Most common in marshes and thickets between Plum Creek, Bates Canyon boat ramp, and Dolomite Point, and in Sanford Marsh; occurs in Rosita Meadows, Bonita Creek, Mullinaw Crossing, Blue West, etc. May nest in AFQNM where seen in shrub patches in late May, 2002. Sings from mid-February. Males chasing females recorded from late April. Adults with food and a vacated nest seen in the Canadian River Valley west of Dolomite Point on June 15, 2002. Another nest in cattails along Bonita Creek on June 18, 2003.

Brown-headed Cowbird *Molothrus ater*

Uncommon breeding species occurring throughout the study area. Nest parasite laying eggs in nests of other species. Two breeding records: 3 cowbird eggs in a nest of Painted Bunting at the North End on June 10, 2002 (hatched by June 13), and 4 cowbird eggs in a nest of Blue Grosbeak at Mullinaw Crossing on June 10, 2003. Additional breeding record provided by Seyffert (2001): "a recently hatched bird and a cowbird egg [in a nest

of Indigo Bunting] was found at Lake Meredith, Potter County, on 10 July, 1995". Northern Mockingbirds observed chasing cowbirds east of Bugbee, but no cowbird eggs found in examined nests of this species.

Common Grackle *Quiscalus quiscula*

Uncommon nesting species inhabiting marshes in the Canadian River Valley. No nests found in this study, but adults bringing food to young seen in marshes between Bates Canyon ramp and Dolomite Point (Potter County) June 15, 2002. Also observed in these marshes in 2003.

Bullock's Oriole *Icterus bullockii*

Uncommon nesting species of cottonwood savanna and semi-desert grasslands with few standing trees. Recorded at Mullinaw Crossing, along Dolomite Point Road, in AFQNM, vicinity of Bugbee, North End, etc. Pendulous nest is usually hidden in foliage, often near branch end, although sometimes built in the open. Nest height (n=4): 3.5–10 m above the ground (average 7.7 m). Nest building recorded in mid-May and large nestlings in mid-June.

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Table 1 Species suspected to nest in LMNRA and AFQ in 2002–03 (35 species) or known from literature (27 species).

Species	Observed	Where observed	Comments/References
Double-crested Cormorant	Yes	5–10 in Bugbee Bay in May-June, 2003	Casual breeder in Texas Panhandle (Seyffert 2001)
Least Bittern	No		Not know to nest in Texas Panhandle (Benson and Arnold 2001). Listed by Anonymous (1982)
Green Heron	Yes	Uncommon in riverine habitats along the Canadian River and its tributaries, Lake Meredith and marshes.	Nesting suspected in LMNRA (Anonymous 1982) and east of Sanford Marsh, Hutchinson Co. (Seyffert 2001).
Black-crowned Night-Heron	Yes	Bugbee Bay in May-June, 2003.	Common nesting species in Texas Panhandle (Benson and Arnold, 2001 Seyffert 2001)
Great Blue Heron	Yes	Throughout Canadian River Valley, on shores of Lake Meredith and at Sanford Marsh.	A rookery is known in Hackberry Canyon of LMNRA (National Park Service 2001)
White-faced Ibis	Yes	A flock of 40 in Sanford Marsh on May 1, 2002, and 10 in Big Blue Creek Bay on May 7, 2002.	Casual nesting species in the Panhandle (Seyffert 2001)
Northern Pintail	No		Nests in Texas Panhandle (Benson and Arnold 2001), included in the LMNRA bird list (Anonymous 1982).
Gadwall	Yes	4 in Sanford Marsh on March 29, 2002	A female with one young in Sanford Marsh on July 5, 1982 (Seyffert 2001). Nests irregularly elsewhere in Texas Panhandle (Seyffert 2001).
Blue-winged Teal	Yes	Pairs in marshes off Plum Creek and Bates Canyon boat ramp, and in Big Blue Creek Bay in late April-early May.	Uncommon species nesting throughout Texas Panhandle, e.g., in Potter, Moore, and Hutchinson counties (Seyffert 2001) and apparently in LMNRA (Anonymous 1982).
Cinnamon Teal	Yes	Pairs in Sanford Marsh, and in Canadian River marshes off Plum Creek in late March to late April (a pair at each site).	Known to breed in Hutchinson County (Seyffert 2001).
Northern Shoveler	Yes	A pair in Sanford Marsh on March 16, 2002; unpaired males in Canadian River marshes in April 2002–03.	Very few confirmed nesting records from Texas Panhandle (Benson and Arnold 2001, Seyffert 2001).
Green-winged Teal	Yes	Pairs or unpaired males at Sanford Marsh, and Canadian River marshes off Plum Creek boat ramp from mid-March through early May.	Rare nesting species in Texas Panhandle. A pair with 4 ducklings at Sanford Marsh on June 15, 1975 (Seyffert 2001).
Redhead	No		Appears on the LMNRA bird list (Anonymous 1982). Several possible and probable nesting records elsewhere in the central Panhandle (Benson and Arnold 2001).
Ruddy Duck	Yes	Canadian River Valley and Sanford Marsh in April-May, 2002.	Occasionally nests in Texas Panhandle southwest of the study area (Seyffert 2001)
Turkey Vulture	Yes	Throughout the study area; probably nests in clefts and cavities of cliffs bordering the Canadian River Valley (at least 5–10 pairs).	
Swainson's Hawk	Yes	A pair at Bates Canyon boat ramp in April, 2002, a pair at North End grasslands in April, 2003, but not found during subsequent visits .	"Fairly common breeder" in the Texas Panhandle (Seyffert 2001) and once a common breeding species at LMNRA (Anonymous 1982).
Golden Eagle	No		A pair nested at LMNRA c. 15–20 years ago, but was shot by a bird collector (M. Smith, USNPS, pers. comm.).
Northern Harrier	No		Occasionally nests in the Texas Panhandle; a female and poorly flying juvenile in Sanford Marsh on July 4, 1985 (Seyffert 2001).

Table 1 (*Continued*)

Species	Observed	Where observed	Comments/References
Ring-necked Pheasant (non-native)	Yes	Rare or secretive in thickets of the Canadian River Valley south of Lake Meredith.	Anonymous (1982) compiler of LMNRA birdlist also pointed out the rarity of this species.
Chukar (non-native)	No		Included by Anonymous (1982). Seyffert (2001) reported that all attempts to introduce this species into the Texas Panhandle had failed.
Lesser Prairie-Chicken	No		Two in LMNRA near Fritch in the fall of 1976, 1 at Blue West on January 4, 1981, and four in the LX Ranch near Bonita Creek on December 27, 1981 (Seyffert 2001).
King Rail	No		A young male in "down plumage" was collected at the Canadian River Breaks, Hutchinson Co. (Seyffert 2001).
Virginia Rail	Yes	Sanford Marsh	"A bird in juvenile plumage" in Sanford Marsh on July 11, 1990, and adult with two downy chicks on April 30, 1993 (Seyffert 2001).
Common Moorhen	Yes	Sanford Marsh	Adult with one chick in Sanford Marsh in August 1976 (Seyffert 2001).
American Coot	Yes	Sanford Marsh	"Resident population" in Sanford Marsh (Seyffert 2001).
Snowy Plover	No		Reported by Anonymous (1982). Not found in the Texas Panhandle during TBBA surveys (Seyffert 2001).
Black-necked Stilt	Yes	Two on Canadian River mudflats off Bates Canyon boat ramp on April 27, 2002.	Uncommon to fairly common breeder in Texas Panhandle including Moore Co. (Benson and Arnold 2001, Seyffert 2001).
American Avocet	Yes	Three congregations (possibly nesting colonies) in April-June, 2002 and 2003: 60–65 on mudflats in Big Blue Creek Bay, 7–8 and 20 on mudflats of the Canadian River between Plum Creek and Bates Canyon boat ramps.	Probably uncommon nesting species (Anonymous 1982).
Spotted Sandpiper	No		A juvenile in Sanford Marsh on July 7, 1998 (Seyffert 2001).
Least Tern	No		An adult male was collected in the Bugbee Creek area on July 4, 1950, and several terns were observed flying along Bugbee Creek (Seyffert 2001).
Rock Dove (non-native)	No		Included by Anonymous (1982). Occurs widely throughout the Panhandle (Seyffert 2001, Benson and Arnold 2001).
Barn Owl	Yes	East of Bugbee on May 5, 2003.	Breeding confirmed in Potter, Moore, and Hutchinson counties (Seyffert 2001).
Great Horned Owl	Yes	Plum Creek, McBride Canyon, Bates Canyon, AFQ, Cedar Canyon, Sanford-Yake, and Spring Canyon.	
Burrowing Owl	No		Listed by (Anonymous 1982). Closely associated with Black-tailed Prairie Dog (Seyffert 2001), but known prairie dog colonies in LMNRA succumbed to plague in 2000–01 (J. Rancier, pers. comm.).
Common Nighthawk	Yes	Rosita Meadows, Mullinaw Crossing, Plum Creek, Bates Canyon, AFQ, North Canyon, the vicinity of Bugbee, etc.	Considered nesting in LMNRA (National Park Service 2001).
Common Poorwill	Yes	One on Cas Johnson Road on June 2, 2003.	Rare to uncommon breeder in Texas Panhandle, e.g., the Canadian River Breaks in Potter County (Barnes and Arnold 2001, Seyffert 2001).

Table 1 (*Continued*)

Species	Observed	Where observed	Comments/References
Chimney Swift	No		Reported by Anonymous (1982); common in the Panhandle (Barnes and Arnold 2001, Seyffert 2001).
Belted Kingfisher	Yes	Sanford Marsh, Bugbee Shores, Big Blue Creek Valley, Chicken Creek	
Red-bellied Woodpecker	No	One at Bonita Creek on November 6, 2003	Listed by Anonymous (1982); nests in Eastern Panhandle (Barnes and Arnold, 2001).
Downy Woodpecker	Yes	McBride Canyon (1–2 pairs)	Nest in the Canadian River Valley elsewhere in Texas Panhandle (Seyffert 2001).
Hairy Woodpecker	No		Reported for LMNRA (Anonymous 1982) and elsewhere in the Canadian River Valley (Barnes and Arnold, 2001; Seyffert 2001).
Horned Lark	No		Common in the Panhandle (Seyffert 2001) and listed for LMNRA (Anonymous 1982).
Barn Swallow	No		Common summer resident and nesting species (Anonymous 1982).
Northern Rough-winged Swallow	No		Nests in the Texas Panhandle (Benson and Arnold 2001, Seyffert 2001), and reported for LMNRA (Anonymous 1982).
Blue Jay	Yes	Rosita Meadow, west of Dolomite Point, Plum Creek, Chicken Creek	Confirmed breeding elsewhere in the Canadian River Valley (Benson and Arnold 2001, Seyffert 2001).
Raven sp. (Chihuahuan Raven or Common Raven)	Yes	One over Rosita Meadows on January 10, 2002, and another on a recently burned area in Bates Canyon on May 4, 2002.	Seyffert (2001) observed Common Raven in LMNRA in winter 1983, 1984 and 1993, in May, 1987 and June, 1994; he also confirmed Chihuahuan Raven in Potter, Moore, and Hutchinson counties.
Canyon Wren	No		Uncommon resident, presumed nesting (Anonymous 1982, Seyffert 2001).
Eastern Bluebird	Yes	Cottonwood savanna in the Canadian River Valley from Rosita Meadows to Devil's Canyon late as April 21.	Nesting suspected by Anonymous (1982) and confirmed in the Panhandle by TBBA (Benson and Arnold 2001).
American Robin	Yes	Several pairs recorded in wooded parts of McBride and Bugbee canyons.	Common nesting species in the 1970s (Anonymous 1982).
Curve-billed Thrasher	No	Present on adjacent ranches, e.g., Alibates and LX ranches	Associated with tree cholla which is rare in LMNRA and absent from AFQ.
Brown Thrasher	Yes	One at Mullinaw Crossing on June 10, 2003	Known to nest in eastern Panhandle and near Dumas in Moore County (Seyffert 2001).
Common Yellowthroat	Yes	A male in wet meadow at Bugbee Creek on May 6, 2003	"A bird in juvenile plumage" in Sanford Marsh on July 27, 1987 (Seyffert 2001).
Lazuli Bunting	No		1–2 singing males between McBride and Mullinaw, and in Plum Creek in 1985 and 1987 (Seyffert 2001).
Indigo Bunting	No		A nest with a cowbird egg at LMNRA on July 10, 1995. "Singing males, adults carrying food, and or juveniles" were recorded at Sanford Dam, libates, McBride canyons, Mullinaw, and Plum Creek (Seyffert 2001).
Dickcissel	No		Widespread nesting species in the Panhandle (Benson and Arnold 2001, Seyffert 2001); listed by Anonymous (1982).

Table 1 (*Continued*)

Species	Observed	Where observed	Comments/References
House Finch	No		Widespread nesting species in the Panhandle (Benson and Arnold 2001, Seyffert 2001); listed by Anonymous (1982).
Grasshopper Sparrow	No		Reported by Anonymous (1982)
Cassin's Sparrow	Yes	AFQNM, Blue West, east of Bugbee and at the North End	Common nesting species (Anonymous 1982).
Rufous-crowned Sparrow	Yes	Bates Canyon, AFQ and Cedar Canyon	Adult with nesting material in McBride Canyon on June 29, 1975, and "a juvenile-plumaged bird" there on July 10, 1985 (Seyffert 2001) .
Eastern Meadowlark	Yes	Spring Canyon and Dolomite Point grasslands	Nesting suspected in LMNRA (Anonymous 1982) and confirmed elsewhere in Hutchinson and Potter counties (Seyffert 2001).
Orchard Oriole	Yes	A male in Bugbee area in May, 2003	Nests in Hutchinson County (Seyffert 2001).
House Sparrow (non-native)	Yes	Observed in upland mesquite-cotton-wood savanna east of Bugbee in March, 2003, probably on a foraging foray.	Reportedly a common resident in LMNRA (Anonymous 1982), but probably more so in surrounding towns and communities.

THREE NOTEWORTHY SPECIES OF WOODLAND BIRDS IN A RIPARIAN FOREST OF THE LOWER NUECES RIVER, SAN PATRICIO COUNTY, TEXAS

Mary Kay Skoruppa[1] and Gene W. Blacklock[2]
[1]*U.S. Geological Survey, Texas Gulf Coast Field Research Station, Corpus Christi, TX 78412*
[2]*Coastal Bend Bays & Estuaries Program, Inc., Corpus Christi, TX 78401*

ABSTRACT.—Tropical Parula (*Parula pitiayumi*), Northern Parula (*Parula americana*), and Summer Tanager (*Piranga rubra*) territorial males were detected 7 June 2005, in San Patricio County, in the Coastal Bend region of South Texas. Eight singing Northern Parula males, 1 pair (1 singing male and 1 nearby female) of Tropical Parulas, and 6 singing Summer Tanager males were detected during a territorial male count for summer breeding birds. Based on behavior (some were observed carrying nesting material) and time of year (June), these species were assumed to be breeding.

Tropical Parulas are considered rare, even in the lower Rio Grande Valley (Hidalgo County) where they once bred commonly (Brush 2005). Brooks and Kenedy counties still support a small population of Tropical Parulas, where they can be found in coastal live oak mottes. Tropical Parula warblers were found on the King Ranch (in Kenedy County) in 1989, but only in a few protected areas where cattle were excluded from oak mottes, thus allowing forbs and mustang grape to flourish in the understory (Rappole and Klicka 1991). Live oak woodlands in Brooks and Kenedy counties are the only areas in Texas with confirmed breeding records of the Tropical Parula (Benson and Arnold 2001). Rare and local summer residents have been reported as far north as Calhoun and Victoria counties (Lockwood and Freeman 2004); however, these reported sightings did not address breeding. Recent reports of nesting Tropical Parulas have been documented in Jeff Davis County in West Texas (Lockwood and Freeman 2004) and Travis County in Central Texas (Lorenz and Hunkapiller 2006).

Northern Parulas breed in southeastern Canada and in the eastern U.S. (Moldenhauer and Regelski 1996). According to U.S. Geological Survey Breeding Bird Survey data (1966–2004), their numbers are stable or increasing (Sauer et al. 2005). Northern Parulas migrate along the South Texas coast (Rappole and Blacklock 1994). The Texas Breeding Bird Atlas documents "probable" breeding only as far south as Victoria County (Benson and Arnold 2001), however, there is one unusual record of nesting in Hidalgo County in the lower

Rio Grande Valley in 1966 (John C. Arvin, in Oberholser 1974) and another sight record (year unknown) in Live Oak County (Oberholser 1974).

The Summer Tanager historically was a common breeding bird of the Corpus Christi area (Hancock 1887). Breeding Summer Tanagers can still be found in the oak forests of Brooks and Kenedy counties, but they have not been found in the lower Rio Grande Valley since 1971, despite once having been common there (Brush 2005).

METHODS AND STUDY AREA

We conducted a survey at the San Patricio de Hibernia Preserve (Hibernia Preserve), a 310 ha tract of land, including about 148 ha of tall riparian forest along the lower Nueces River near Old San Patricio, Texas (about 34 km west of Corpus Christi). Our survey began at 0600 hr by walking along a trail parallel to the river bank. The survey was completed by 1000 hr. All singing birds were identified, and the approximate location of each was indicated on a map of the study area.

The riparian corridor is mostly co-dominated by cedar elm (*Ulmus crassifolia*), sugar hackberry (*Celtis laevigata*), and anacua (*Ehretia anacua*). The southwestern corner of the property is dominated by live oak (*Quercus virginiana*). Spanish moss (*Tillandsia usneoides*) and ball-moss (*Tillandsia recurvata*) are conspicuous throughout the canopy of all four tree species. Black Willow (*Salix nigra*) is common along the river bank. The understory is composed of a diversity of native brush, including granjeno (*Celtis pallida*), lime prickly-ash (*Zanthoxylum fagara*), and brasil (*Condalia hookeri*), and, in many places, is covered with mustang grape (*Vitis mustangensis*) interspersed with dewberry (*Rosa trivialis*) vines.

RESULTS

We detected a total of 26 species during the Hibernia Preserve survey (Blacklock and Skoruppa 2005). Of these, eight singing Northern Parula males were detected along with at least one pair of Tropical Parula warblers. Because the Tropical Parula song is nearly identical to that of the Northern Parula, we can definitively conclude the presence of only 1 pair of Tropical Parula warblers, which we were able to observe clearly for approximately 5 min in a cedar elm tree. During this time, we were able to confirm unequivocally the absence of eye-crescents on both the male and female. Of the parula warblers that we were able to see, all others were Northern Parulas. Six singing Summer Tanager males were detected.

DISCUSSION

Our observation of a nesting pair of Tropical Parulas represents the third instance of breeding behavior outside of the known breeding range for this species (Lockwood and Freeman 2004, Lorenz and Hunkapiller 2006). These sightings (all within the last five years) may indicate that the Tropical Parula is expanding its range. Perhaps more significant is the discovery of a second location in Texas with overlapping breeding populations of Tropical and Northern Parula warblers. Our observation of a breeding pair of Tropical Parulas among a breeding population of Northern Parulas may suggest that the two are separate species. However, similarity in morphology, nesting habits, and voice has led some authors to consider the two conspecific (Mayr and Short 1970). Recent genetic data suggest this as well (Lovette and Bermingham 2001), but sample size was small (DNA was extracted from only 2 Northern Parula warblers). Other researchers have suggested that overlapping breeding populations of Tropical and Northern Parula warblers may be causing hybridization between these closely related species (Brush 2005, Lorenz and Hunkapiller 2006). The occurrence of overlapping populations in South Texas (this study) and in Central Texas (Lorenz and Hunkapiller 2006) may indicate that the riparian corridors along south-central Texas rivers systems (i.e., the Nueces, San Antonio, Guadalupe, and Colorado river systems) are a zone of overlapping populations for Tropical and Northern Parulas. Additional research in these riparian corridors is needed to shed more light on the taxonomy, evolution, and ecology of these two species.

The breeding Northern Parulas at Hibernia Preserve represent the first breeding record in coastal Texas south of Victoria County since at least 1974. The habitat at the Hibernia Preserve is consistent with known habitat in traditional breeding areas (epiphytic growth in tall riparian forests). It is unknown when the breeding Northern Parulas arrived at Hibernia Preserve, but we heard parulas singing as early as 4 March (2006) and 30 March (2005).

In addition, we documented six territorial male Summer Tanagers at the Hibernia Preserve. This is an important observation because the Summer Tanager is no longer considered a breeding bird along the lower

Northern Parula (*Parula americana*). Photo by Fernando Cerra.

Nueces River (Benson and Arnold 2001), nor has it been documented in any South Texas Breeding Bird Survey routes since 1985 (Robsinson 1996).

The presence of this relatively undisturbed riparian forest in San Patricio County is also significant, because more than 90% of the riparian habitat in South Texas has been cleared for agricultural or urban use (Jahrsdoerfer and Leslie 1988, Fulbright and Bryant 2002). The San Patricio de Hibernia Preserve can maintain breeding woodland bird populations, including rare and/or tropical breeding birds, by protecting the riparian habitat from fragmentation (i.e., excessive road construction or other clearing), which could lower breeding bird species diversity (Rupert and Brush 2006) and increase cowbird parasitism on parula warblers and Summer Tanagers (Friedmann and Kiff 1985, Robinson 1996, Brush 1999). Both species of parula are dependent upon Spanish moss for nesting. This epiphyte is especially sensitive to air pollution (Moldenhauer and Regelski 1996, Regelski and Moldenhauer 1997) and changes in humidity. Livestock grazing or alteration of the understory could alter the microclimate that sustains the Spanish moss, thus threatening one of the few remaining unspoiled riparian forests in South Texas.

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ACCOUNTS OF BIRDS IN TEXAS NEWSPAPERS, 1830–1860

Stanley D. Casto[1]
Department of Biology, University of Mary Hardin-Baylor, Belton, Texas 76513

ABSTRACT.—Eighty-eight accounts of birds published in Texas newspapers before 1860 are discussed according to their subject content. A chronological list of references to birds published in Texas papers before 1860 is presented as an appendix.

Nearly 350 newspapers were published in Texas before the Civil War. Most of these papers were "propaganda or special-purpose sheets" dealing with politics (Sibley 1983). Many early papers were short-lived and few if any issues are still in existence. Those that are still available occasionally contain information on birds. Newspapers were widely exchanged between communities and, because of this practice, the same article was often printed in more than one paper. Periodicals from the eastern United States were also widely circulated in Texas and articles on birds were often reprinted from these sources.

Fundamental changes in the fauna and flora of Texas are believed to have begun about 1860 (Weniger 1984). The following accounts thus represent a time before the natural environment and bird life of Texas had undergone major alteration. Unfortunately, it was also a time when there was little organized science in Texas. Although several ornithologists and collectors [J. J. and J. W. Audubon, Edward Harris, S. W. Woodhouse, Adolphus Heermann, J. P. McCown, G. A. McCall and the naturalists of the U.S.–Mexico Boundary Survey] visited or worked in Texas before 1860, their published works were not readily available to the general public. For most Texans, newspapers articles were perhaps the only material they might ever read containing information on birds.

Eighty-eight articles mentioning birds have been found in Texas newspapers published before 1860. Considering the turmoil of revolution, nationhood, statehood, and impending civil war, as well as problems on the frontier, it is surprising that birds received any attention whatsoever. Birds were seldom identified to species, an omission attributable to the fact that lists and guides to Texas birds were not available until the 1850s (Baird,

[1] Present address: 159 Red Oak, Seguin, Texas 78155. E-mail: Sscasto2@aol.com

1858, 1859, Cassin 1856, Woodhouse 1853). While most of the information in the early accounts is factual, some interpretations are highly romanticized. At least one story is fictional and intended only as entertainment.

The following newspaper accounts are arranged in eight categories based on their subject content: abundance, hunting, migration, crop depredation, behavior, morbidity and morality, protection, and "miscellaneous." A chronological list of articles on birds published before 1860 is presented in the appendix. The exact date and newspaper in which an account was published, if not cited in the text, can be determined by consulting the appendix.

ABUNDANCE OF BIRDS

Texans have always had strong feelings about vultures (Casto 1988) and it is not surprising that they are the first species to be featured in a Texas newspaper. This account, a colorful blend of truth and fiction, was written by "The Traveller" and published in the *Texas Gazette* on 27 February 1830 at the small village of San Felipe de Austin. The identity of "The Traveller" is unknown but a clue to his nationality may perhaps be found in the British spelling of his pen name.

Two stories were used by "The Traveller" to illustrate abundance of the Turkey Vulture. In the first story, a sportsman killed a large buck that he then hung in a tree before going home. Upon returning within an hour and a half, he was amazed to see large numbers of vultures and to find the bones of the buck hanging from the tree but "completely stripped of hide, flesh, muscle and sinew." In the second story, a hunter came upon two deer in the prairie grass, one of which was shot whereupon the other fled some 200 paces where it was also shot and killed. As the hunter tended to the second deer, he noticed vultures gathering at the carcass of the first. Suspecting their purpose, he ran back to the first deer only to find it mostly devoured. Then, while pondering this turn of events, he looked back to where the second deer had fallen only to see it covered with vultures and, for the most part, already consumed.

The stories of "The Traveller" strain the credibility of modern readers. However, Orceneth Fisher, a Methodist minister who visited Texas in 1839, tells of a cow being reduced by vultures to a pile of bones in less than an hour (Fisher 1841). Two things seem obvious from these accounts—vultures were very numerous and they were adept at defleshing the carcasses of the large herbivores with which they shared the prairies of Texas.

Other species, in addition to vultures, were also very abundant in early Texas. Huge flocks of "wild pigeons' [Passenger Pigeons] were reported in 1843, 1845, 1851, and 1856. Immense numbers of partridges [bobwhites] were seen at Clarksville in 1843. "Swarms of plover" [most likely Upland Sandpipers] were present in the vicinity of Galveston during the spring of 1857. In 1855 flocks of plovers "covered" the prairies in Gonzales County. Plovers were so numerous in Washington County during the spring of 1857 that it seemed as if "the whole earth [was] covered with them." Just as awesome but more menacing were the enormous flocks of marauding Dickcissels that devastated the spring wheat of North Central Texas (Casto 2002).

HUNTING OF BIRDS

Hunting for sport was seldom mentioned in the newspapers and most reports are from coastal areas such as Harris (1840), Galveston (1843, 1845), Nueces (1858, 1860), and Matagorda counties (1858). There are also isolated reports from the inland counties of Bexar (1854) and Washington (1857).

Ducks, geese, plovers, snipe, partridges [bobwhites], wild pigeons, turkeys, and swans were the birds most often hunted. During April 1843, the carelessness of hunters while shooting plover within the city limits of Galveston resulted in the accidental wounding of three citizens. Large numbers of wild pigeons were killed with poles at the roost near Clarksville in 1843. The actual number of birds taken by a hunting party was occasionally mentioned. For example, during October 1845 a slave on Colonel [James] Morgan's plantation near Galveston killed 65 ducks in two hours. Three Germans killed 90 bobwhites on the outskirts of San Antonio during November 1854. A traveler between Brenham and Washington shot numerous plover along the road between Brenham and Washington during March 1857. A contest sponsored by a hunting club during January 1858 resulted in 117 geese and 44 turkeys being taken at Corpus Christi. In October 1858, two residents of Austin were reported to have killed 40 ducks and 7 brants. One sportsman attempted to import and propagate a species for the purpose of hunting. In 1857, Hugh Haynie, a sportsman from Austin brought two pairs of Gambel's Quail from El Paso that he hoped to release in Travis County. The birds did not reproduce, and the experiment ended in failure.

Freshly killed birds were routinely displayed in the markets, peddled door-to-door, and sold to the restaurants in early Texas (Casto 1983). During the winter of 1852, the markets at Indianola were well stocked with ducks

Wild Pigeons in Texas. – We learn from the *Northern Standard* that large numbers of wild pigeons established their roosts in the country around Clarksville in Red River County, in the fore part of June last. They were often knocked down at night and killed with sticks and poles by citizens of that section, who found their visit acceptable, as they were fat and tender. The oldest citizens of that county had never seen them in that section in summer and it is supposed the remarkable cold season caused them to form their roosts further south than heretofore [*Telegraph and Texas Register*, 16 Aug. 1843].

Figure 1. **Wild Pigeons in Texas.** Passenger Pigeons generally arrived on their wintering grounds in Texas during late September or October. The occurrence of a large roost at Clarksville during June 1843 suggests that a significant number of birds did not migrate north during the spring of 1843 but instead remained to nest somewhere in north central Texas or Indian Territory.

and geese. The markets at Galveston offered "almost every variety" of ducks and geese during 1857. Advertisements for the hotel at Anderson in Grimes County were illustrated in 1856 with images of a plover and a turkey accompanied by the boast that the hotel table would "always be supplied with the best that the market affords."

Feathers were valued commodities in early Texas. In 1839 feathers were selling in New Orleans for 50–60 cents per pound but by 1852 the price had declined to 30–40 cents. Feathers were not common on hats during this time, and it is assumed that these prices were for down feathers used for stuffing mattresses and pillows. Following the epizootic that killed thousands of geese, brant [smaller species of geese] and other waterfowl in Galveston Bay during 1845, local citizens quickly set about gathering feathers from the dead birds (Casto 2004).

MIGRATION OF BIRDS

The fall migration of waterfowl received considerable attention. The arrival of the first geese was considered a sign that the weather would soon turn cold. The wisdom of this folklore was verified when the arrival of geese at Houston during the first week of September 1839 was followed within a few days by the first norther of the season. The relationship between the arrival of geese and the onset of cold weather was further noted in reports published at Houston during 1841, 1843, 1845, 1848, and at Belton during 1858. The arrival of ducks, geese, and other winter fowl at Indianola during October 1859 relieved the apprehension of further outbreaks of yellow fever, a viral disease carried by mosquitoes. Sandhill Cranes were also considered to be a "harbinger of cold weather" (*Belton Independent*, 23 Oct. 1858). The enormous flocks of swallows along the Texas coast were said to always leave on their southern migration within a few days following the arrival of the first geese (*Telegraph and Texas Register*, 20 Oct. 1841).

Only two species, Dickcissels and Purple Martins, are mentioned as spring migrants. Dickcissels arrived in North Central Texas during mid to late May at the time the spring wheat was beginning to mature (Casto 2002). In 1845 and 1847, the first Purple Martins returned to Houston during the last week in February.

A casual reference to spring migration is found in the *Galveston Weekly News* for 19 May 1857. In a letter dated May 3rd, a correspondent ["G.N."] from Corpus Christi mentioned seeing large numbers of brightly colored birds of different "varieties" in the area. The birds were most likely warblers, and their occurrence in such numbers as to arouse the curiosity of a layperson may perhaps be explained by the climatic events that occurred in the preceding weeks.

The year 1857 began with typical winter weather, but in early February there was an unseasonable warming. By April the grass was green, gardens and orchards were thriving, and shrubs and trees were covered with leaves and blooms. This "false spring" soon came to an end. On April 5th, an Arctic cold front entered the state and over the next three days killed much of the emerging spring vegetation. This first cold wave was followed

> ***Caution to Sportsmen***. – Not less than three accidents, fortunately but slight, have occurred within a few days past from the carelessness of people shooting birds in the suburbs of town, the shot having struck persons and entered houses within the range of the fire. In two cases narrow escapes were had from fatal results. The swarms of plover upon the prairie keep hunters continually employed, and many families live in fear of accidents. There is an ordinance against shooting in the vicinity of houses and we learn that complaints will be made against offenders and its strict enforcement exacted hereafter [*Civilian and Galveston City Gazette*, 11 April 1843].

Figure 2. **Caution to Sportsmen.** Flocks of migrating plovers were sometimes found within the city limits of Galveston. The ordinance against shooting in the vicinity of houses was commonly ignored by hunters with the result that bystanders were often peppered with birdshot.

by a second "norther" on April 10th that produced hail and snow as far south as Austin. A third episode of freezing temperatures from about April 21st to the 24th left much of the vegetation throughout the state looking as though it had been killed by fire (Casto 2003). It is likely that the severity of the weather during late April stalled the northward passage of warblers resulting in unusually large numbers being seen along the Texas coast.

CROP DEPREDATION BY BIRDS

Dickcissels or "wheat birds" as they were commonly called, were major pests in North Central Texas from 1849 through the mid-1890s (Casto 2002, Ragsdale 1892). Migrating flocks consisting of millions of birds arrived in Texas during the early spring when the wheat was in the "dough" stage. Individual birds would alight on a stalk, insert their bill into a grain and extract the soft contents, and so on until the entire head was destroyed. Efforts to drive the birds from the fields were generally futile (Casto 2002). Newspaper accounts of the depredations of Dickcissels are known for 1857, 1858, 1859, and 1860.

Larks and blackbirds were also reported to be agricultural pests. The *Galveston Weekly News* noted that these species were doing serious damage to the young corn in Caldwell County during the spring of 1859. The birds apparently attacked the corn following appearance of the sprouts. By pecking and scratching around the sprouts, they would unearth the corn grains, which would then be eaten. In 1839, readers of the Houston *Morning Star* were advised that corn soaked in a strong solution of saltpeter [potassium nitrate] and scattered throughout the field would deter the depredations of crows. In 1852, strychnine was widely used around LaGrange to poison blackbirds, crows, and other pests.

Orchards and fruit trees were widespread in Texas before 1860, yet no reports of depredations by birds on this produce have been found. Although the Carolina Parakeet was widely believed to be an orchard pest, no mention of this species has been found in the early newspapers. Neither has there been found any mention of mockingbirds and woodpeckers, which occasionally damage fruit. Beneficial birds included "jays" which spread of the seeds of shrubs and trees (*Northern Standard*, 10 Sept. 1842) and plovers that ate young grasshoppers during the spring (*Galveston Weekly News*, 10 April 1855). Although normally considered to be a serious agricultural pest, the Dickcissels that arrived in Dallas County during the spring of 1857 were praised for their good work in controlling an outbreak of "cutworms."

BEHAVIOR OF BIRDS

Early Texans were undoubtedly keen observers of birds, yet little was published on the behavior of resident species. Many of the accounts are romanticized anecdotes of little or no scientific value. Several of the articles were originally published in eastern newspapers and magazines.

The "sagacity" of geese and ducks was the subject of two early anecdotes. The earliest account (1841) describes the food begging behavior of a goose owned by a planter at San Augustine. Each morning at daybreak the gander would tap incessantly on the door to awaken its owner. When the door was opened, the goose would perform a series of nods and wing flaps after which it would head for the corncrib with the expectation of receiving a handful of corn. A second anecdote describes an imagined romantic triangle in Mandarin ducks during which a rival male is killed at the behest of a female that had been sexually harassed (Matagorda *Weekly Dispatch*, 21 Sept. 1844).

A delightful description of the courtship and nesting of a pair of Barn Swallows was published in the *Civilian and Galveston Gazette* during 1844. The identity of the author [Mrs. Child] is uncertain, although she may have been the wife of George Washington Child who lived in Colorado County. In this charming but highly anthropomorphic account, the author describes the courtship, nesting building, incubation, brooding, and fledging of the young of a pair of Barn Swallows that had taken up residence in the family woodshed

The foraging and flocking behavior of "wheat birds" [Dickcissels] is described in the San Augustine *Eastern Texian* for 5 June 1858. The description of how the birds extract the soft material of the immature wheat grains and the response of the flocks to efforts by the farmers to drive them from the fields, strongly suggests that an eyewitness wrote the account.

Several accounts of bird behavior are from papers or magazines published in the eastern United States. In 1839 the *Colorado Gazette and Advertiser* featured an article from the *Baltimore Sun* describing how a Bald Eagle harassed a "fish hawk" [Osprey] causing it to drop the fish that it was carrying. The fish was caught in mid-air by the eagle and carried away to be eaten, a behavior today known as kleptoparasitism. Articles reprinted from the *Boston Traveller* include a description of the response of a pair of nesting swallows to a snake (1845) and the story of a young Bobolink that learned to imitate the songs of canaries (1851). Articles reprinted from *Country Gentleman* [NY] describe the behavior of a small, unidentified bird foraging for insects on a row of cabbages (*Dallas Herald*, 1 June 1859) and the activity of a pair of Blue Titmice [England] while attending their young (San Antonio *Daily Ledger and Texan*, 21 Dec. 1860). An article reprinted from the *New England Farmer* describes what were believed to be seven different songs of the Song Sparrow [*Washington American*, 12 Nov. 1856].

The Corpus Christi *Ranchero* for 22 December 1860 noted that birds communicate the presence of food to others of their species and that the alarm note of the parent bird instantly silences the chirping of its young. Vision was judged to be more important to the safety of birds than their sense of smell. An article in the Belton *Weekly Independent* (3 Oct. 1857) explained that hummingbirds use their tongue to obtain

Birds of Passage. – The wild geese are just returning from the north. Their early arrival is a harbinger of cold weather. We may therefore look out for a frost within a few days. It is a singular fact that the swallows leave this country for the southern latitudes, just as the wild geese return from the north; whether they are warned by the sight of the geese, to commence their flight, or are influenced by some impulse of instinct is a query for the naturalist to solve. A few days since immense flocks of swallows were seen flying about preparatory to taking their final leave for the season. Within a day or two we have not seen one remaining [*Telegraph and Texas Register*, 20 October 1841].

Figure 3. **Birds of Passage.** Residents along the gulf coast believed that the arrival of geese indicated that the weather would soon turn cold. The observation that swallows departed shortly after the arrival of the geese suggests that the editor of the *Telegraph and Texas Register* was a keen observer of bird behavior.

Corpus Christi, May 3, 1857

Eds. News: -- Last night we had the first rain of any note since Oct. 26th, '56. The first part of the winter was very mild, but since March 13th, fires have been kept up to this day, and I am now sitting by a good fire. There is, at this time, a strange phenomenon about this region, in the shape of a numerous variety of birds, never before seen in this country. They are of all varieties, colors and hues. Can any of your scientific readers account for this?.... Yours, &c., G. N. [*Galveston Weekly News*, 19 May 1857].

Figure 4. **Letter from Corpus Christi.** The factors responsible for the "fall-out" of early migrants along the Texas gulf coast are now well known. However, nothing was known of this phenomenon in 1857 and the author of this letter was eager to find someone who could explain this unusual occurrence.

nectar and catch insects, oystercatchers use their bill to open bivalves, and tailorbirds use their bills and feet to construct nests.

MORBIDITY AND MORTALITY OF BIRDS

A severe storm passed over Galveston Bay one night during the first week of November 1845. The following morning thousands of dead ducks, brant [smaller varieties of geese, and other waterfowl were found dead in the bay. Various causes were suggested but no conclusion was reached. In retrospect, the evidence suggests that the birds died of cholera. If so, this event represents the first report of an avian epizootic in Texas and perhaps in the entire United States (Casto 2004). Less than a month after the epizootic in Galveston Bay, the Houston *Morning Star* (2 Dec. 1845) reported that many of the geese killed by hunters in the interior counties were so poor and weak that they could hardly fly. Disease was suggested as a possible cause.

Storms undoubtedly resulted in the deaths of many birds but mortality from this cause was seldom reported. Brief articles during 1844 and 1847 in the *Telegraph and Texas Register* noted that many fowls were killed during severe hailstorms in Robertson and Lavaca counties. Although no mortality was noted, a severe 'norther' during February 1851 caused the "snow birds" [juncos?] at Clarksville to seek shelter within houses and other manmade structures.

PROTECTION OF BIRDS

The migratory locust (*Melanoplus spretus*) made its first appearance in Texas during 1845. Little attention was paid to this pest until October 1848 when enormous swarms of grasshoppers suddenly appeared on the prairies between Waco and San Antonio. The adult hoppers devastated the native vegetation, as well as the crops and gardens of the settlers before depositing their eggs in the soil. These eggs hatched during the first warm days of 1849 and the wingless young soon spread over the countryside consuming all forms of plant life. In an article originally published in the *Southwestern Christian Advocate* [Nashville, TN] and reprinted in the *Texas Democrat* (21 April 1849), it was noted that "prairie fowls" consumed vast numbers of the young locusts, and it was suggested this entire class of birds should be protected between February and September. This acknowledgment of the role of birds in controlling insects and of the need for their protection may perhaps mark the beginning of the conservation movement in Texas.

The need and desirability of protecting birds again became a public issue during the latter 1850s. In an article originally published in the *Lancaster Whig* [PA] and reprinted in the *Washington American* on 26 May 1857, it was stated that the recent increase in harmful insects was due to the wanton destruction of birds. Several species of birds were declared to be benefactors of man and, in contrast to prevailing opinion, it was claimed that crows and blackbirds do more good than harm.

Birds and other wildlife were often ill treated in early Texas. In contrast, the *Belton Weekly Independent* for 22 May 1858 noted that birds in Japan were treated "very kindly" and never shot for sport. When the sailors

with Commodore Perry began to shoot birds, the Japanese implored their commander to stop the practice. It was further related that the treaty signed between the United States and Japan included a provision that the birds of Japan must be protected. Drawing a parallel, it was maintained that the birds in the United States should also be protected and that if this were not done people might as well say "good bye to fruit, for the insects will [surely] eat it up."

Birds and other wildlife were hunted year-round with no limit on the number killed. The excesses of this practice were first brought to the attention of the public in an article published in the *Nueces Valley* [Corpus Christi] on 14 December 1857 which suggested that a judicious game law "would be beneficial to the future of Texas." A bill establishing such a law was introduced into the Legislature by the representative from Corpus Christi but was tabled without consideration. No further attempts were made to protect birds until the passage on 2 February 1860 of a law to protect the quail on Galveston Island (Gammel 1898).

MISCELLANEOUS ARTICLES

Several articles do not fit the above categories. Topics covered in these miscellaneous articles include reports of a great flight of birds at Baltimore, Maryland, the possible role of birds in transferring fish eggs, activities of the Audubon family, mockingbirds at La Grange, killing eagles, fossil bird tracks, bird guano, the commercial harvest of birds' eggs, collection of the White-tailed Ptarmigan in the United States, and the fictional story of the "Turpentine Turkeys."

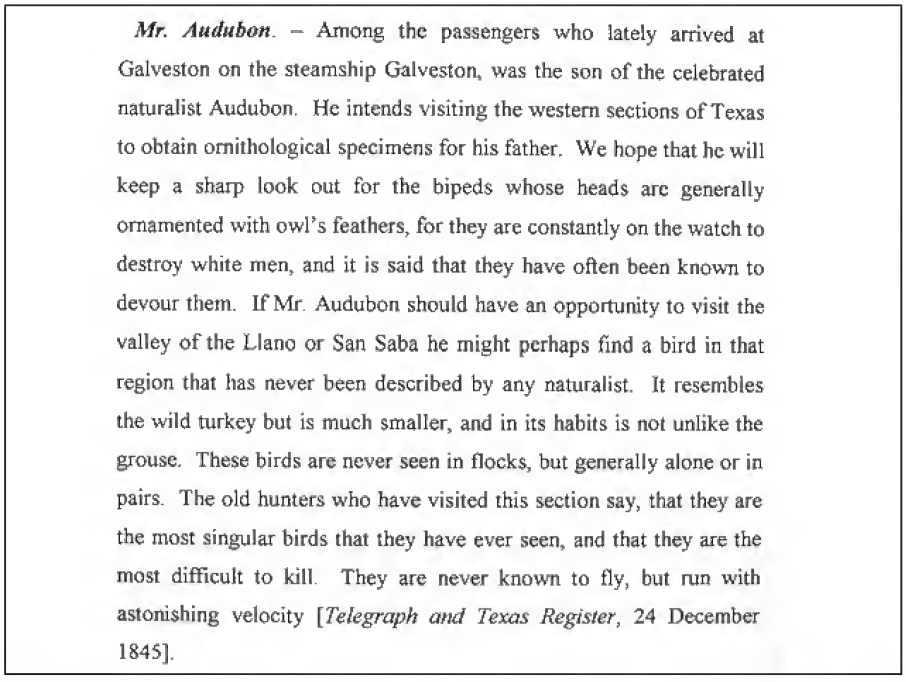
Great Flight of Birds.—A great number of shorebirds, presumed to be plovers, were seen flying over Baltimore, Maryland, during a nocturnal thunderstorm in the late spring of 1843. The flight was considered unusual because of the lateness of the season and the enormous number of birds involved. Several of the birds, described as about the size of robins and having a grayish plumage, became grounded during the storm and were captured the following morning. Details of this event were published in the *Baltimore American* and reprinted in the *Telegraph and Texas Register* on 5 July 1843.

Transfer of Fish Eggs.—Travelers in the coastal counties observed a strange phenomenon during October and November 1843. The prairies were covered with shallow pools of water as a result of heavy rains during the preceding months. In these "mud holes" were thousands of tiny catfish. Since these pools had no connection with any stream, most people believed that the fish had been deposited along with the rain. This explanation was rejected by the editor of the *Telegraph and Texas Register* in favor of the equally improbable idea that birds had deposited the eggs of the catfish on the prairie where they had remained in a dormant state until the fall rains created a favorable condition for them to hatch.

John James and Lucy Audubon.–John James Audubon was well known in Texas and his activities were occasionally noted in the press. In the spring of 1843, it was announced that Audubon had recently arrived in Cincinnati, Ohio, on his way to collect birds in the Rocky Mountains. A second article (1847) noted the work of Audubon on the birds and quadrupeds of North America and attributed much of his success to his wife, Lucy, a "calm, wise, cheerful helper, who had suffered hardships and long separations while steadfastly supporting the work of her husband." A memorial to the life and work of Audubon was published in the *Telegraph & Texas Register* following his death on 27 January 1851.

Mockingbirds at LaGrange.—In mid-February 1845 it was reported that the mockingbirds at LaGrange had begun to sing thus indicating an early spring. A second article during April 1845 noted that the mockingbird "bears to us the glorious intelligence that the sad and dreary winter has past." Drawing an analogy with the political events of the era, it was further suggested that the "joyous" song of the mockingbird also signaled the impending annexation of Texas by the United States.

John Woodhouse Audubon.—John James Audubon never returned to Texas following his collecting trip to Galveston in 1837. He did, however, send his son, John Woodhouse Audubon, to collect birds and mammals in western Texas. The younger Audubon arrived at Galveston on 22 December 1845. The article announcing his arrival expressed the hope that Audubon would keep a sharp lookout for those bipeds that ornamented their heads with owl feathers. This warning was not given in jest for the area west of San Antonio was then under attack by bands of hostile Indians. Audubon collected around San Antonio for several weeks but, because of the Indian menace, was unable to visit the San Saba and Llano rivers as originally planned. Although a number of mammals were collected, there seems to be no record of any new species of birds being taken (Anon. 1846, Ford 1951).



Mr. Audubon. – Among the passengers who lately arrived at Galveston on the steamship Galveston, was the son of the celebrated naturalist Audubon. He intends visiting the western sections of Texas to obtain ornithological specimens for his father. We hope that he will keep a sharp look out for the bipeds whose heads are generally ornamented with owl's feathers, for they are constantly on the watch to destroy white men, and it is said that they have often been known to devour them. If Mr. Audubon should have an opportunity to visit the valley of the Llano or San Saba he might perhaps find a bird in that region that has never been described by any naturalist. It resembles the wild turkey but is much smaller, and in its habits is not unlike the grouse. These birds are never seen in flocks, but generally alone or in pairs. The old hunters who have visited this section say, that they are the most singular birds that they have ever seen, and that they are the most difficult to kill. They are never known to fly, but run with astonishing velocity [*Telegraph and Texas Register*, 24 December 1845].

Figure 5. **Mr. Audubon.** John James Audubon and his son, John Woodhouse, were well known in Texas. In this article the editor of the *Telegraph and Texas Register* notes the dangers and the opportunities that the younger Audubon would encounter while collecting in the interior of Texas.

Man Kills Eagles.—In March of 1846, the *LaGrange Intelligencer* published the story of a man from Sodus Bay, New York, who supposedly used a club to kill two Bald Eagles that were engaged in fierce combat while on the ground.

Fossil Bird Tracks.—Experts on fossil birds were undoubtedly as scarce as hen's teeth in early Texas. This lack of formal training did not, however, stop the editor of the *Corpus Christi Star* (1848) from declaring, without evidence or explanation, that tracks found in the limestone strata along "The Brushy [Creek?]" were probably those of a giant, extinct bird.

Guano.—Bird guano, most likely obtained from the droppings of domestic fowls, was undoubtedly used as a fertilizer in early Texas. Guano may also have been collected from some of the traditional roosting sites of Passenger Pigeons, such as the roost on Wolf Creek north of Palestine where deposits were a foot or more deep (Casto 2001). Three articles mention the use of guano as a fertilizer. The first, published in 1851, described the value of poultry manure as a fertilizer whereas a later article (1855) noted that the direct application of guano to a plant might cause it to burn. A third article in 1856 described the bird life and guano deposits on the islands off the coast of Peru.

Edible Nests.—An article in the *Telegraph & Texas Register* during 1851 described the nests of the Edible-nest Swiftlet in China. Although it was noted that the nests were highly valued by Chinese epicures, the author apparently did not know that the nests were constructed of the dried saliva of the birds.

Egging.—There may have been some interest in the commercial harvest of eggs in early Texas. In 1855, the *Central Texian* featured an article on "egging" based on information from a correspondent in San Francisco. In this article, it was claimed that 500,000 Murre eggs had been collected on the Fallarone Islands and sold in San Francisco during the 1854 nesting season. Although there is no direct evidence, it is reasonable to assume that the eggs of birds nesting along the Texas coast were occasionally harvested for sale during the 1840s and 1850s.

White-tailed Ptarmigan.—Exploration of the western United States was well underway during the 1850s and people were eager to learn of the most recent discoveries. In August 1858, the San Augustine *Eastern Texian* announced that during his explorations in the Rocky Mountains Captain R. B. Marcy had obtained specimens of the White-tailed Ptarmigan, the first ever taken in the United States. The skins of two birds, collected at Cochetope Pass, Colorado, were forwarded to the Smithsonian and were, at the time of their receipt, the only specimens of the species in any American museum (Baird 1858).

Turpentine Turkeys.—This masterpiece of imagination is included in a letter dated 2 October 1843 that was first published in the Concordia *Intelligencer* [LA] and later in the *Spirit of the Times* [NY] and, finally, in the Matagorda *Weekly Dispatch* on 30 March 1844. The author of the letter ("P.O.F.") was part of a group exploring the Cross Timbers of Texas and Oklahoma. Game was scarce and the explorers were living mainly on wild turkeys found in the area. Food was also in short supply for the turkeys, which were compelled by necessity to eat large quantities of "pine burrs." After eating the "burrs" for a long time the turkeys became "so impregnated with turpentine, that they caught fire" and burned up when an attempt was made to roast them. This dilemma was solved when one of the men took a dozen turkeys, well cleaned, covered them with six inches of dirt, and then built a large fire over the pile. While the birds were cooking, small streams of clear tar were seen running out of the heap but by evening they were well-cooked, having shrunk to the size of chickens and, although "very dry," still tolerable for food.

The turpentine turkeys were also reported to have saved the scalps of a band of hunters some months earlier. Indians had surrounded the hunters in a small patch of brush and were waiting for morning to make their attack. During the night there was a terrible storm and a bolt of lightning struck a nearby tree in which a flock of turkeys were roosting. As the lightning descended into the tree, the turkeys "were instantly on fire, and flying toward the Indians, fell blazing and hissing among them." The Indians, believing these feathered fireballs evidence of the superior weaponry of the white men, immediately fled leaving the hunters "in peaceful possession of the country."

ACKNOWLEDGEMENTS

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Appendix 1.

Accounts of Birds in Texas Newspapers, 1830-1860.

YEAR	LOCALITY	NEWSPAPER	SUMMARY OF CONTENTS
1830	Austin County	*Texas Gazette* (27 Feb. 1830)	describes enormous numbers of Turkey Vultures on Texas prairies
1839	Harris County	Houston *Morning Star* (24 April 1839)	feathers sell for 50-60 cents per pound in New Orleans
1839	Harris County	Houston *Morning Star* (30 April 1839)	corn soaked in a strong brine of saltpeter repels crow
1839	Matagorda County	Colorado *Gazette and Advertiser* (16 Nov. 1839)	Bald Eagle steals a fish from an Osprey
1839	Harris County	Houston *Morning Star* (11 Sept. 1839)	arrival of geese indicates the early onset of winter
1840	Harris County	Houston *Morning Star* (27 Oct. 1840)	ducks and geese are being hunted in the vicinity
1841	San Augustine County	*Red-Lander* (30 Sept. 1841).	describes food-begging behavior of a pet goose
1841	Harris County	Houston *Morning Star* (20 Oct. 1841)	geese arriving…immense flocks of swallows prepare to head south
1842	Red River County	*Northern Standard* (10 Sept. 1842)	advises on the importance of jays in spreading seeds of shrubs and trees
1843	Red River County	*Northern Standard* (14 Jan. 1843)	large numbers of partridges [bobwhites] near Clarksville
1843	Galveston County	*Civilian & Galveston Gazette* (11 April 1843)	swarms of plover on prairies…many shot in suburbs of Galveston
1843	Harris County	*Telegraph and Texas Register* (19 April 1843)	Audubon arrives at Cincinnati on his way to the Rocky Mountains
1843	Harris County	*Telegraph and Texas Register* (5 July 1843)	large, nocturnal flight of birds passes over Baltimore, MD
1843	Red River County	*Northern Standard* (13 July 1843)	wild pigeon roost near Clarksville for past six weeks
1843	Harris County	*Telegraph & Texas Register* (18 Oct. 1843)	geese and other migratory birds are arriving
1843	Galveston County	*Civilian & Galveston Gazette* (28 Oct. 1843)	wild fowl abundant… hunters having great sport
1843	Harris County	*Telegraph & Texas Register* (29 Nov. 1943)	birds believed to deposit eggs of catfish in prairie potholes
1843	Red River County	*Northern Standard* (16 Dec. 1843)	pigeons killed at roost ten miles from Clarksville
1844	Matagorda County	Matagorda *Weekly Dispatch* (30 Mar. 1844)	fictional story of the turpentine turkeys
1844	Harris County	*Telegraph and Texas Register* (10 April 1844)	hailstorm kills fowls in Robertson County
1844	Galveston County	*Civilian & Galveston Gazette* (25 May 1844)	account of the nesting of a pair of Barn Swallows
1844	Matagorda County	Matagorda *Weekly Dispatch* (21 Sept. 1844)	story of love and revenge in Mandarin ducks
1845	Fayette County	*LaGrange Intelligencer* (13 Feb. 1845)	notes that mockingbirds are beginning to sing
1845	Harris County	Houston *Morning Star* (1 Mar. 1845)	notes return of Purple Martins to Houston
1845	Fayette County	*LaGrange Intelligencer* (7 April 1845)	song of mockingbirds announces arrival of spring

Continued

Column 1, year of publication; Column 2, county in which the newspaper was published; Column 3, name of newspaper and date of publication; Column 4, brief description of contents.

YEAR	LOCALITY	NEWSPAPER	SUMMARY OF CONTENTS
1845	Harris County	*Telegraph & Texas Register* (15 Oct. 1845)	large numbers of geese arriving from the north
1845	Galveston County	Houston *Morning Star* (21 Oct. 1845)	inlets of Galveston Bay filled with ducks, brant, and geese
1845	Harris County	*Telegraph and Texas Register* (22 Oct. 1845)	response of a pair of nesting swallows to a snake
1845	Harris County	Houston *Morning Star* (8 Nov. 1845)	ducks, brant and waterfowl die suddenly on Galveston Bay
1845	Harris County	Houston *Morning Star* (2 Dec. 1845)	many geese poor and weak and scarcely able to fly
1845	Harris County	*Telegraph & Texas Register* (24 Dec. 1845)	announces arrival of John Woodhouse Audubon at Galveston
1845	Harris County	*Telegraph & Texas Register* (31 Dec. 1845)	immense flocks of wild pigeons near mouth of Trinity River
1846	Fayette County	*LaGrange Intelligencer* (14 March 1846)	man kills two Bald Eagles with a club
1846	Harris County	*Telegraph & Texas Register* (21 Oct. 1846)	large flocks of geese passing over Houston
1847	Fayette County	LaGrange *Far West* (13 Feb. 1847)	praises domestic attributes of Lucy Bakewell, wife of J. J. Audubon
1847	Harris County	*Telegraph and Texas Register* (22 Feb. 1847)	notes departure of geese and arrival of Purple Martins
1847	Harris County	*Telegraph & Texas Register* (29 Mar. 1847)	many fowls killed by a severe hailstorm in Lavaca County
1848	Harris County	*Telegraph & Texas Register* (19 Oct. 1848)	first geese seen flying over Houston
1848	Nueces County	*Corpus Christi Star* (16 Dec. 1848)	notes tracks believed those of an extinct bird
1849	Travis County	Austin *Texas Democrat* (21 April 1849)	proposes protection of "prairie fowls" February to September
1851	Red River County	*Northern Standard* (1 March 1851)	"snowbirds" [juncos?] seek shelter during sudden norther
1851	Harris County	*Telegraph & Texas Register* (7 March 1851)	memorial of life and work of John James Audubon
1851	Harris County	*Telegraph & Texas Register* (2 May 1851)	advises that poultry manure be used as fertilizer
1851	Galveston County	*Civilian & Galveston Gazette* (27 May 1851)	Bobolink alleged to mimic the songs of canaries
1851	Harris County	*Telegraph & Texas Register* (7 Nov. 1851)	describes nests of Edible-nest Swiftlet in China
1851	Harris County	*Telegraph & Texas Register* (26 Dec. 1851)	large numbers of wild pigeons in forests near Houston
1852	Fayette County	La Grange *Texas Monument* (17 Nov. 1852)	notes use of strychnine to kill blackbirds and crows
1852	Galveston County	*Civilian & Galveston Gazette* (23 Nov. 1852)	feathers selling for 35-40 cents per pound
1852	Calhoun County	*Indianola Bulletin* (25 Nov. 1852)	market well supplied with ducks and geese
1854	Bexar County	San Antonio *Alamo Star* (27 Nov. 1854)	three hunters kill 90 partridges [bobwhites] near San Antonio
1855	Grimes County	Anderson *Central Texian* (17 Mar. 1855)	describes collection of Murre eggs on coastal islands of California
1855	Galveston County	*Galveston Weekly News* (10 April 1855)	plovers around Gonzales feeding on grasshoppers
1855	Brazoria County	Brazoria *Texas Planter* (27 June 1855)	reprint of government advice on the use of guano

Continued

YEAR	LOCALITY	NEWSPAPER	SUMMARY OF CONTENTS
1855	Brazoria County	Brazoria *Texas Planter* (27 June 1855)	guinea fowls claimed to rid farm of rats
1856	Grimes County	Anderson *Central Texian* (17 Sept. 1856)	discusses guano deposits on islands off coast of Peru
1856	Houston County	*Houston Weekly Telegraph* (22 Oct. 1856)	immense flocks of wild pigeons flying daily over Crockett
1856	Washington County	*Washington American* (12 Nov. 1856)	discusses songs of the Song Sparrow and other birds
1856	Grimes County	Anderson *Central Texian* (10 Dec. 1856)	illustrations of turkey and plover advertise cuisine of Anderson Hotel
1856	Anderson County	*Houston Weekly Telegraph* (17 Dec. 1856)	wild pigeons killed at a roost near Palestine
1857	Washington County	*Washington American* (24 March 1857)	whole earth seems covered with plovers
1857	Galveston County	*Galveston Weekly News* (24 Mar. 1857)	plovers abundant between Brenham and Washington
1857	Dallas County	*Houston Weekly Telegraph* (13 May 1857)	wheat birds [dickcissels] eating millions of cutworms
1857	Galveston County	*Galveston Weekly News* (19 May 1857)	large numbers of brightly colored birds seen around Corpus Christi
1857	Washington County	*Washington American* (26 May 1857)	reprint of "Don't Destroy the Birds" from *Lancaster Whig*
1857	Travis County	Austin *Texas Sentinel* (12 September 1857)	local sportsman attempts to raise and release Gambel's Quail
1857	Grimes County	Anderson *Central Texian* (17 Sept. 1857)	discusses guano deposits on islands off the coast of Peru
1857	Bell County	Belton *Weekly Independent* (3 Oct. 1857)	describes tongue of hummingbirds and bill of oystercatchers
1857	Galveston County	*Civilian & Galveston Gazette* (3 Nov. 1857)	geese and ducks of every variety being sold in the city markets
1857	Nueces County	Corpus Christi *Nueces Valley* (14 Nov. 1857)	notes abundance of turkeys, geese, ducks, snipe, plover, and swans
1857	Nueces County	Corpus Christi *Nueces Valley* (19 Dec. 1857)	discusses the need for passage of a law to protect game
1857	Nueces County	Corpus Christi *Nueces Valley* (19 Dec. 1857)	local hunters believe game should be protected
1858	Nueces County	Corpus Christi *Nueces Valley* (2 Jan. 1858)	"hunting match" yields 7,500 animals including 117 geese and 44 turkeys
1858	Bell County	*Belton Weekly Independent* (22 May 1858)	notes that birds are treated kindly in Japan and not hunted for sport
1858	Harris County	*Houston Weekly Telegraph* (26 May 1858)	wheat birds [dickcissels] make their appearance at Dallas
1858	San Augustine County	San Augustine *Eastern Texian* (5 June 1858)	describes first appearance of dickcissils at Dallas in 1849
1858	San Augustine County	San Augustine *Eastern Texian* (14 Aug. 1858)	notes first specimens of White-tailed Ptarmigan taken in United States
1858	Travis County	*Southern Intelligencer* (13 October 1858)	recent norther brings abundance of ducks and geese
1858	Bell County	*Belton Independent* (2 Oct 1858)	birds destroy first crop of corn
1858	Bell County	*Belton Independent* (23 Oct. 1858)	geese and sandhill cranes seen passing over
1858	Matagorda County	*Matagorda Gazette* (6 November 1858)	geese, ducks, snipe, and partridges abundant
1859	Galveston County	*Galveston Weekly News* (29 Mar. 1859)	larks and blackbirds injure young corn at Caldwell

Continued

YEAR	LOCALITY	NEWSPAPER	SUMMARY OF CONTENTS
1859	Colorado County	Columbus *Colorado Citizen* (21 May 1859)	millions of wheat birds (dickcissels) appear in Freestone County
1859	Dallas County	*Dallas Herald* (1 June	praises the foraging behavior of a small, unidentified bird
1859	Calhoun County	*Indianola Courier* (22 October 1859)	ducks, geese and other winter birds signals end of yellow fever
1860	Harris County	*Houston Weekly Telegraph* (5 June 1857)	dickcissels destroying wheat in Freestone County
1860	Nueces County	Corpus Christi *Ranchero* (27 Oct. 1860)	ducks and geese arriving in considerable numbers
1860	Nueces County	Corpus Christi *Ranchero* (17 Nov. 1860)	hunters kill swan…aquatic fowls abundant around Corpus Christi
1860	Bexar County	*Daily Ledger and Texan* (21 Dec. 1860)	describes behavior of Blue Titmice while feeding young [England]
1860	Nueces County	Corpus Christi *Ranchero* (22 Dec. 1860)	describes ability to communicate sources of food and to warn young

SHORT COMMUNICATIONS

OBSERVATIONS OF RECAPTURED WHITE-WINGED DOVES WITH SUBCUTANEOUS RADIO-TRANSMITTER IMPLANTS

Michael F. Small[1], John T. Baccus[1], and T. Wayne Schwertner[2]

[1]Department of Biology, Wildlife Ecology Program, Texas State University–San Marcos, San Marcos, Texas 78666, and [2]Texas Parks and Wildlife Department, White-winged Dove Program, Mason, Texas 76856

Prior to 1900, White-winged Doves (*Zenaida asiatica*) in the U.S. occurred in greatest concentrations in the lower Rio Grande Valley (LRGV), a 4-county region at the southernmost tip of Texas (Dresser 1866, Cottam and Trefethen 1968). Although loss of White-winged Dove nesting habitat in the LRGV began in the 1800s with an influx of European settlers, large scale clearing of land for agricultural, industrial, and municipal use began about 1920 (Purdy and Tomlinson 1982). In addition, water withdrawal from the lower Rio Grande to supply these

Figure 1. A radio-transmitter (a) just prior to implantation in a White-winged Dove and (b) the White-winged Dove about 10 min post-implantation.

Figure 2. Radio-transmittered White-winged Doves (a) 35 days post-implantation and (b) 51 days post-implantation.

industries and loss of the normal flood-pulse cycle following construction of Falcon Lake Dam in 1950 hastened the loss of riparian habitat (Pollok et al. 1998, Richter and Richter 2000, Cowell and Stoudt 2002).

Also beginning about 1920, White-winged Doves in Texas began a northward range expansion into urban areas and portions of these populations have become year-round residents. This range expansion escalated about 1950 and peaked from about 1970 to present (Small 2006*a*). Whether this phenomenon is coincidental or correlated to habitat loss has not been definitively determined. However, these newly established, often large (5,000 to > 1,000,000 doves) populations now outnumber traditional populations (George et al. 1994), creating a need to understand their ecological dynamics in developing a comprehensive management plan for the species.

Radio-telemetry may provide a means to efficiently collect natural history data on populations provided the tagging does not affect the animal's behavior (White and Garrott 2000). In captive Mourning Doves (*Zenaida macroura*), subcutaneously implanted transmitters have been demonstrated as a preferred method of radio-transmitter attachment (Schulz et al. 1996, 2001). In captive and field studies on Mourning Doves in South Carolina, Berdeen and Otis (2006) determined that subcutaneously implanted radio-transmitters met the assumption that survival was independent of radio-transmitters. Small et al. (2004*b*) also showed a preference for the implant method for White-winged Doves housed in flight pens. Field studies using implanted subcutaneous transmitters on White-winged Doves have shown that this technique can produce valuable information (Small et al. 2005, 2006*b*). Herein, we describe the external condition of recaptured, wild White-winged Doves with subcutaneously implanted radio-transmitters. As part of a study conducted in Mason, Texas (Mason County) using radio-telemetry and leg banding, we implanted 44 White-winged Doves in the field with subcutaneous radio-transmitters. We used modified Kniffin traps (Reeves et al. 1968) baited with a mixture of cracked corn, sorghum, and black oil sunflower seeds to capture White-winged Doves. We used transmitters obtained from Advanced Telemetry Services (Isanti, MN) that measured 41.83 × 26.83 × 7.62 mm (± 0.05 mm) with external whip antennas (15.24 ± 0.01 cm). We implanted transmitters in the field between 13 and 22 February 2006 following the protocol described in Small et al. (2004*a*, *b*, 2006*b*) (Fig. 1a, b).

During the course of our study, we recaptured 3 subcutaneously implanted White-winged Doves and conducted a thorough external examination. The first dove, an adult female, was implanted on 27 January 2006 and recaptured 8 days post-implant. The second dove, an adult female, was implanted on 21 January 2006 and recaptured 35 days post-implant. The third dove, an adult male, was implanted on 19 January 2006 and recaptured 51 days post-implant.

We thoroughly examined the 3 individuals and found no indications of adverse effects from the implanted transmitter. We were unable to locate the incision site in all 3 doves. We did observe new feathers growing over the incision site of the first dove. All doves were undergoing some degree of body feather molt. None of the doves had inflammation, the presence of redness, or an accumulation of polymorphonuclear cells at or around the incision site suggesting the absence of pyogenic bacterial infection.

All 3 doves showed no indication of discomfort or emaciation as determined by feeling the breast musculature and comparing with other doves without implants. In 1 dove we could feel the transmitter, which had moved several cm dorso-laterally. The transmitters could not be felt in the other 2 doves because their crops were engorged with trap bait. The antennas' percutaneous exit site showed no signs of infection or dermatitis. Without external antennas we would not have identified these doves as having implanted transmitters (Fig. 2a, b). We in no way are suggesting that this is evidence of no detrimental effect of radio-transmitters on White-winged Doves; however, we believe this is the first report of examinations of wild, recaptured doves with implanted radio-transmitters in the U.S.

All activities were conducted in accordance with Texas State University "San Marcos IACUC approval #06-05CC59736D, state permit #SPR-0890-234, and federal permit #06827."

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A CASE OF A MAGNIFICENT FRIGATEBIRD (*FREGATA MAGNIFICENS*) SWALLOWING A FISHHOOK

Martha E. Magee and Daniel M. Brooks[1]

Houston Museum of Natural Science; Department of Vertebrate Zoology;
[1]Hermann Circle Dr.; Houston, TX. 77030–1799

Avian mortality caused by foreign (e.g., Arnold 1994) or natural (e.g., Holte and Houck 2000, Brooks and Steingreaber 2002) objects is rarely documented, but does occur in nature. While encounters with fishing tackle can be a danger to birds, specific examples are seldom documented (Arnold 1994). Moreover, injuries involving fishing tackle are often restricted to the mandibles and/or oral cavity (Bennett and Erickson 1962, Chatwin 1956). Herein we report a case of a fishhook swallowed by a Magnificent Frigatebird (*Fregata magnificens*).

On 8 August 2006 we received a salvaged Magnificent Frigatebird (HMNS VO-1968) that was found on Surfside Beach, Brazoria County, Texas, on 17 July 2006. On 22 August 2006 the bird, an adult female, was prepared as a study skin. During this process the stomach was opened so that its contents could be measured and recorded. Five parasitic worms were found; the only other item was a #6 fishhook, its barb buried in the wall of the stomach, with the broken shank protruding into the stomach cavity. A blackened layer of corrosion residue lined the wound created by passage of the hook, surrounded by a margin of inflamed tissue with a radius <1 mm. The stomach otherwise appeared normal, but the lack of any food residue suggests that the bird had been unable to eat for some period prior to its death.

[1]E-mail: dbrooks@hmns.org

Female Magnificent Frigatebird (HMNS VO-1968). Photo by M. Magee.

The hook shard found in the Frigatebird specimen, next to a dime for scale. Photo by M. Magee.

Although perforation of the stomach alone might well have proved fatal either due to infection or starvation, a probable contributory cause of death was a traumatic amputation of the right manus. It is unknown if both the wing and stomach injuries arose from a single circumstance, such as entanglement in a fishing line.

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HENSLOW'S SPARROWS (*AMMODRAMUS HENSLOWII*) WINTERING IN LAMAR COUNTY TEXAS WITH NOTES ON HABITAT PREFERENCE

Stephan Lorenz[1]

Department of Biology, University of Texas at Tyler, 3900 University Blvd., Tyler, TX 75799

The Henslow's Sparrow (*Ammodramus henslowii*) is a small, secretive grassland sparrow of wet meadows, neglected fields, wet hay fields, swamps and sometimes dry upland prairies (Rising and Beadle 1996). Its breeding range extends north into Ontario and northeastern U.S. states, east into Pennsylvania, south into Kentucky, and west into northeastern Oklahoma. Even though it breeds throughout a relatively large range it is often very localized (Herkert et al. 2002). Breeding Henslow's Sparrows prefer grasslands with high amounts of tall dense vegetation, litter cover or standing dead vegetation and low amounts of woody vegetation (Zimmerman 1988, Herkert 1994, Cully and Michaels 2000). The species is disturbance dependent on its breeding grounds, but very recent disturbance like prescribed burns, mowing or haying reduce breeding densities of Henslow's Sparrows (Zimmerman 1988, Herkert 1994, Cully and Michaels 2000). Henslow's Sparrows winter throughout the southeastern United States (Rising and Beadle 1996, Herkert et al. 2002). The winter range extends at least north to southern Arkansas (Herkert et al. 2002) and rarely into central Oklahoma (Rising and Beadle 1996). Degradation

[1]E-mail: slorenz@mail.com

Figure 1. One of 14 Henslow's Sparrows (Ammodramus henslowii) mistenetted during the winters of 2004-2005 and 2005-2006. The species appears to winter regularly in Lamar County. Photo by Stephan Lorenz.

Figure 2. Preferred habitat of Henslow's Sparrows (Ammodramus henslowii) at Camp Maxey, Lamar County Texas. The area is dominated by little bluestem (Schizachyrium scoparium) and shows signs of recent burns. Photo by Stephan Lorenz.

and destruction of grassland habitats have imperiled this species and due to dramatic declines the Henslow's Sparrow has been identified as a species of concern (Pashley 1996, Sauer et al. 2001, Herkert et al. 2002).

In Texas Henslow's Sparrows are considered rare to very rare migrant and winter residents from mid-October to early April. They are mostly found in the eastern third of the state with rare occurrences in north-central Texas,

Table 1. Mean vegetation variables of grassland sites at Camp Maxey, Lamar County, occupied by wintering Henslow's Sparrows. Vegetation measurements were collected for four sites in 2005 and six sites in 2006. Standard deviations shown in parentheses.

Vegetation Variable	2005		2006	
Mean Height of Standing Grasses (cm)	69.0	(21.3)	61.0	(17.0)
Mean Litter depth (cm)	8.0	(3.0)	5.4	(2.9)
Mean Density (dm)	1.2	(0.5)	1.1	(.50)
Mean percentage of grass cover	54.0	(3.8)	58.0	(8.5)
Mean percentage of litter cover	31.0	(5.3)	19.0	(6.6)
Mean percentage of bare ground	11.0	(4.5)	14.0	(4.7)
Mean percentage of woody vegetation	1.0	(1.3)	6.0	(8.0)

the Coastal Prairies, and Panhandle region (Lockwood and Freeman 2004). A resident population in Harris County is now considered extinct (Arnold and Garza 1998). During winter Henslow's Sparrows prefer areas with dense ground cover in boggy or grassy pine flats, or low moist areas (Herkert et al. 2002), mainly in longleaf pine (*Pinus palustris*) communities (Herkert et al. 2002, Carrie et al. 2002, Bechtoldt and Stouffer 2005). In Alabama Henslow's Sparrows were found in bogs with thick grass cover (Plentovich et al. 1999). Generally the species benefits from fire disturbance which is an integral part of suitable winter habitat (Plentovich et al. 1999, Herkert et al. 2002). Recent research has evaluated habitat preference of wintering Henslow's Sparrows in many parts of its winter range (Chandler and Woodrey 1995, Plentovich et al. 1999, Carrie et al. 2002, Bechtoldt and Stouffer 2005, Thatcher et al. 2005), but currently no such information exists for Texas.

During the winters of 2004–2005 and 2005–2006 I found a winter population of Henslow's Sparrows in Lamar County, Texas. Shackelford and Brooks (2001) did not list Lamar County in a summary of sighting reports of Henslow's Sparrows for the winter of 1998–1999 and the closest county with a record to Lamar County was Bowie County, which is approximately 100 kilometers east of Lamar County. The secretive habits and dense habitat of the species make it difficult to locate and the distribution within Texas is not yet entirely understood. Herein I report on the location of a winter population in Lamar County with additional notes on habitat preference within the area.

Henslow's Sparrows were found on Camp Maxey, a Texas Army National Guard Training Facility 16 kilometers north of Paris in Lamar County, Texas. Camp Maxey encompasses 2600 ha of habitat associated with Post Oak Savanna and Blackland Prairie vegetation communities. The terrain is flat to rolling hills with an average elevation of 170 meters. The dominant habitat type includes a mixture of prairie openings and open deciduous woodland composed mainly of post oak (*Quercus stellata*), blackjack oak (*Q. marilandica*), and other drought-tolerant plant species. Similar habitat is found on lands managed by the U.S. Army Corps of Engineers surrounding nearby Pat Mayse Lake. The majority of prairie openings within Camp Maxey are old fields that have reverted to grasslands dominated by little bluestem (*Schizachyrium scoparium*), indiangrass (*Sorghastrum avenaceum*), and a profusion of composites, legumes, and other forbs. The prairie openings are maintained through prescribed burns and accidental fires. In areas not recently burned, woody plants such as smooth sumac (*Rhus glabra*), chicksaw plum (*Prunus angustifolia*) and eastern red cedar (*Juniperus virginiana*), are encroaching.

During the winter of 2004–2005 I recorded at least 10 individual Henslow's Sparrows on Camp Maxey, and 11 individuals during the winter of 2005–2006 (Figure 1). Henslow's Sparrows were first noted during November 2004 with two sightings of two birds. Six additional sightings of at least two birds in two sites occurred between the 18 December 2004 and 4 January 2005. Extensive mistnetting at four grassland sites within the study area revealed additional birds. Six individuals were mist netted at four sites between the 4 December 2004 and 28 January 2005. In 2005–2006 I observed at least three individuals in three different sites between 16 December 2005 and 12 January 2006. Also during the same winter I mistnetted eight Henslow's Sparrows at four sites between 30 October and 25 December 2005. All birds caught in mistnets were banded with a U.S. Fish and Wildlife Service aluminum band. No Henslow's Sparrows banded in 2004–2005 were recaptured the following winter. A lack of site fidelity for wintering sites has also been found in Alabama (Plentovich et al. 1998), but Bechtoldt and Stouffer (2005) recaptured two individuals the second year out of 32 banded during the first year in Louisiana. Thus Henslow's Sparrows may exhibit limited winter site fidelity where suitable habitat remains available for more than one year (Bechtoldt and Stouffer 2005).

HABITAT

Vegetation measurements were collected as part of a concurrent study within 25 circular study plots [0.78 ha (radius 50 m)] located throughout grasslands of the study area. Within each circular plot, two perpendicular 100-m line transects were delineated at the center of each plot. Orientation of line transects were randomly determined. Measurements were taken at ten meter intervals along each line transect resulting in 21 grid points. At each grid point I estimated ground cover in five percent intervals using a 20 x 50 cm Daubenmire frame (Daubenmire 1959). Ground estimates were arcsin transformed prior to calculating mean values (Sokal and Rohlf 1995). I estimated vegetation density in decimeter intervals using a Robel pole placed in the center of the 20 x 50 cm frame (Robel et al. 1970). I also measured maximum height of standing grasses within the 20 x 50 cm frame and measured litter depth at the four corners of the 20 x 50 cm frame.

Henslow's Sparrows were exclusively found in grassland openings containing large proportions of little bluestem (Figure 2). Birds were often flushed along edges of openings and took cover in brushy areas. Two

birds were found in relatively short vegetation, including one individual flushed from the edge of a gravel road. Low sample size precludes me from making statistical inferences about occupied versus unoccupied sites, thus I only report mean vegetation variables for occupied sites. In 2004–2005 I measured vegetation in four sites occupied by Henslow's Sparrows. In 2005–2006 vegetation measurements were made at six sites occupied by Henslow's Sparrows. Overall Henslow's Sparrows were found in habitats having more than 50 percent grass (Poaceae) cover and less than 10 percent cover of woody vegetation. Litter cover varied from 19 to 31 percent cover during the two winters. Additionally sites occupied by Henslow's Sparrows were dominated by tall standing grasses, deep litter cover, and dense vegetation (Table 1).

Anecdotal evidence suggests that Henslow's Sparrows are more common during wet years and habitat preferences of the species suggests that birds are found in wet or moist areas. Interestingly the species appeared slightly more common or at least as numerous during the drought year of 2005–2006. In 2004–2005 the study area included grasslands that contained large amounts of standing water. Prevalent drought conditions in 2005–2006 left no standing water in any of the grasslands or study plots. Yet eight individuals were banded in 59.75 hrs of total effort in 2005–2006, compared to six individuals during 118 hrs total effort in 2004–2005 Carrie et al. (2002) also found Henslow's Sparrows to winter in drier sites than previously reported. Prescribed burns conducted within the camp during the spring of 2005 may have improved habitat, even though very recent burns and disturbance caused by mowing and vehicles are most likely detrimental Henslow's Sparrows generally benefit from fire disturbance on their wintering grounds (Carrie et al. 2002) and biennial rotational burns have been recommended to improve wintering habitat for the species in Louisiana and Mississippi (Bechtoldt and Stouffer 2005, Thatcher et al. 2005).

It is difficult to estimate the total population size of Henslow's Sparrows wintering at Camp Maxey, but due to the secretive nature of the species, large amounts of available habitat not surveyed, additional habitat on U. S. Army Corps of Engineer lands around Pat Mayse lake, and dates of observations, it is likely that a regular wintering population of Henslow's Sparrows occurs in Lamar County. These findings warrant further surveys of suitable habitat and possible management recommendations stressing prescribed burns.

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ADJOINING NESTS OF NORTHERN CARDINAL

Ray C. Telfair II[1]
11780 South Hill Creek Road, Whitehouse, Texas 75791

The Northern Cardinal (*Cardinalis cardinalis*) is territorial and builds a nest usually in shrubs, small tress, or low-hanging branches, with a mean nest height of 1–2 m and range of 0.25–12m (Halkin and Linville 1999). Apparently, there are no reports of adjoining nests (Halkin, pers. comm.).

On 25 June 2006, while trimming shrubbery at my home in Ennis (Ellis Co.), I found two abandoned and adjoining apparent Northern Cardinal nests (Fig. 1). They were in a densely-stemmed bridal wreath (*Spiraea prunifolia*) about 30.5 cm beneath the top of the canopy and about 1.7 m above the ground. One of the nests was bowl-shaped and measured about 11.4 cm outside diameter and 7.6 cm in height; the other one was saucer-shaped and measured about 11.4 cm outside diameter and 5.1 cm in height. The composition of both nests was similar: small twigs, grass stems, dried partly decomposed leaves, and pieces of paper (white and purple) and clear cellophane. The complete nest was bowl-shaped, the bottom and sides of the bowl-shaped nest was composed of a rough layer of crisscrossed strips of bark from eastern red-cedar (*Juniperus virginiana*). The saucer-shaped nest contained no bark strips.

The bowl-shaped nest looks typical of Northern Cardinal nests that have been observed in the low shrubbery at that location for a period of 50 years of observation. However, during that period, no saucer-shaped or adjoining nests have been seen. Northern Cardinals are the most common nesters there.

Other species that nest in the shrubbery are Mourning Dove (*Zenaida macroura*), Northern Mockingbird (*Mimus polyglottos*), and, rarely, Brown Thrasher (*Toxostoma rufum*).

The paper and cellophane in both nests was similar, but the amount in each nest is unusual (Halkin, pers.

Figure 1. Adjoining Northern Cardinal nests (photo courtesy of Mark, Daniel, and Monica Jones). The horizontal white object above the nests is a 15 cm measuring rule.

[1]E-mail: rtelfair@nctv.com

comm.). However, small pieces of paper and cellophane (from candy wrappers and cigarette packs) are readily available along the sidewalks and alley that border the yard.

According to Bent (1968), some Northern Cardinal nests are compactly built and well-lined, but others are flimsy with scarcely any lining. Ritchison (1997) reported that females occasionally begin constructing a nest, but fail to complete it. However, the nature of these adjoining nests is puzzling. Both nests appear to have been made in the spring of the current breeding season. The saucer-shaped nest may have not had the upper layers built up to make the walls of the cup and, thus, may have been "incomplete" (Halkin, pers. comm.).

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CAROLINA MANTID (*STAGMOMANTIS CAROLINA*) CAPTURES AND FEEDS ON A BROAD-TAILED HUMMINGBIRD (*SELASPHORUS PLATYCERCUS*)

Stephan Lorenz[1]

[1]*Dept. of Biology, Univ. of Texas at Tyler, 3900 University Blvd., Tyler, TX 75799*

Documented instances of predation on adult hummingbirds in temperate latitudes are rare and predation is not a significant risk factor for adult hummingbirds in temperate latitudes (Miller and Gass 1985). The Tiny Hawk (*Accipiter superciliosus*) however may specialize on hummingbirds in the New World tropics (Stiles 1978). Even though predation on adult hummingbirds is rarely observed, a variety of predators have been documented, including raptors (Beebe 1950, Lowery 1938, Mayr 1966, Peeters 1963, Sick 1993, Sprot 1927, Stiles 1978), other birds

Figure 1. Carolina Mantid (Stagmomantis carolina) feeding on captured first-year female Broad-tailed Hummingbird (Selasphorus platycercus). Photo by Stephan Lorenz.

[1]E-mail: slorenz@mail.com

(Sick 1993, Wright 1962), mammals (Bent 1964, Sick 1993), snakes (Sick 1993), frogs (Monroe 1957, Norris-Elye 1944), and fish (Lockwood 1922). There are also three documented cases of mantid (*Mantis* sp.) predation on adult hummingbirds (Butler 1949, Hildebrand 1949, Murray 1958). All three cases involved the Ruby-throated Hummingbird (*Archilochus colubris*), and in each case the hummingbird and mantid were separated by the observer. Here I report a case of a Carolina Mantid (*Stagmomantis carolina*) capturing a hummingbird.

On August 22, 2005 while observing hummingbirds in Franklin Mountains State Park, El Paso County, Texas I observed a Carolina Mantid capture and feed on a first-year female Broad-tailed Hummingbird (*Selasphorus platycercus*). Franklin Mountains State Park covers 9812 hectares within the city limits of El Paso and includes a variety of habitats ranging from desert to mountains up to 2192 m in elevation. Broad-tailed Hummingbirds breed and migrate throughout higher elevation areas in West Texas with males moving south earlier than females (Calder and Calder 1992). While observing hummingbirds in an area containing a spring and cottonwoods (*Populus* sp.) and brush attractive to migrant birds, I noted several Broad-tailed Hummingbirds feeding on a flowering thistle (*Cirsium* sp.) at approximately five minute intervals. After an hour of continued observation, a shrill squeak attracted my attention to the flowering thistle. Upon closer inspection I found that a Carolina Mantid had clasped a first-year female Broad-tailed Hummingbird, which struggled for another minute before dying (Fig. 1). The mantid started feeding along the neckline of the hummingbird and blood became visible. I continued watching the scene from a distance, and other Broad-tailed Hummingbirds continued to visit the flowering thistle. After feeding, the hummingbirds would hover for a few seconds in front of the mantid and dead hummingbird. When I left the area an hour later the mantid was still clasping and feeding on the hummingbird.

This marks an additional documented record of a Carolina Mantid capturing a hummingbird species and one of only a few documented records of predation on adult Broad-tailed Hummingbirds. An earlier report documents a male impaled on a barbed wire fence as a result of either shrike (*Lanius* sp.) or American Kestrel predation (Calder and Calder 1992). The present record also suggests that predation by mantids on adult hummingbirds is not confined to hummingbird feeder or garden settings where most observations have occurred (Miller and Gass 1985). The Carolina Mantid is the most widespread mantid in the United States, ranging from Virginia to Florida, northeast to Indiana and west to California and Mexico (Milne and Milne 1980). Its range overlaps with the majority of hummingbird species found in the United States, most of which are similar in size or smaller than the Broad-tailed Hummingbird and could potentially be predated by Carolina Mantids. Based on this observation and other documented and anecdotal reports predation on hummingbirds by mantids may be more widespread than currently reflected by the published literature.

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UNUSUAL BEWICK'S WREN BEHAVIOR

John M. Cys and Greg Mucciolo
Wichita Falls, Texas 76310

In late May, 2006, while checking a bluebird nest box trail in the vicinity of Lake Arrowhead State Park, Clay County, Texas, we observed previously undocumented Bewick's wren (*Thryomanes bewickii*) behavior. When opening one nest box a female Bewick's wren was standing beside the nest cup with a house sparrow (*Passer domesticus*) egg in her beak. She immediately dropped the egg and flew. There was a second house sparrow egg next to the nest box wall away from the cup. Places for the two house sparrow eggs were present in the arrangement of the four Bewick's wren eggs in the nest. When another nest box was opened there were five Bewick's wren eggs in the nest cup and one house sparrow egg next to the nest box wall away from the cup. We interpret this behavior as a female Bewick's wren recognizing the house sparrow eggs as not hers and moving them next to the nest box wall so they would not hatch. It is unknown why the house sparrow eggs were not completely removed from the nest boxes. The following week we found the first nest destroyed with egg shell fragments on the ground below the nest box and the eggs in the second box covered with ants.

It is interesting to compare the above behavior with that of the Bewick's wren response to brown-headed cowbird (*Molothrus ater*) eggs in a nest box. Laura Packer (personal communication, 2006) when checking a bluebird trail in the vicinity of Abilene, Texas, found a nest box with four Bewick's wren and one brown-headed cowbird egg in it. Later when she returned to remove it the cowbird egg was missing as Farley (1987) found in Kansas. The female Bewick's wren continued to incubate her eggs. Later she found another nest box with a partially completed Bewick's wren nest with one cowbird egg in it. She removed the egg. There was no additional activity. Her interpretation is when the cowbird egg was found the Bewick's wrens abandoned the nest box so the cowbird egg would not hatch. It is both noteworthy and puzzling that female Bewick's wrens will move house sparrow eggs next to the nest box wall away from the cup; whereas they will completely remove cowbird eggs from the nest box or abandon the box.

The authors wish to thank Laura Packer for kindly allowing the use of her observational data for comparative purposes. In addition to her example of cowbirds parasitizing Bewick's wren eggs in a nest box, Kennedy and White (1997) report 15 recorded cases. Presumably at least some of these were in nest boxes. The authors also acknowledge the helpful comments of an anonymous reviewer.

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[1]E-mail: cysbirdwatcher@onebox.com

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Jack Clinton Eitniear, Editor, E-mail: Bulletin@Texasbirds.org
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Northern Jacana (*Jacana spinosa*) photographed in Texas. Image by Erik Breden